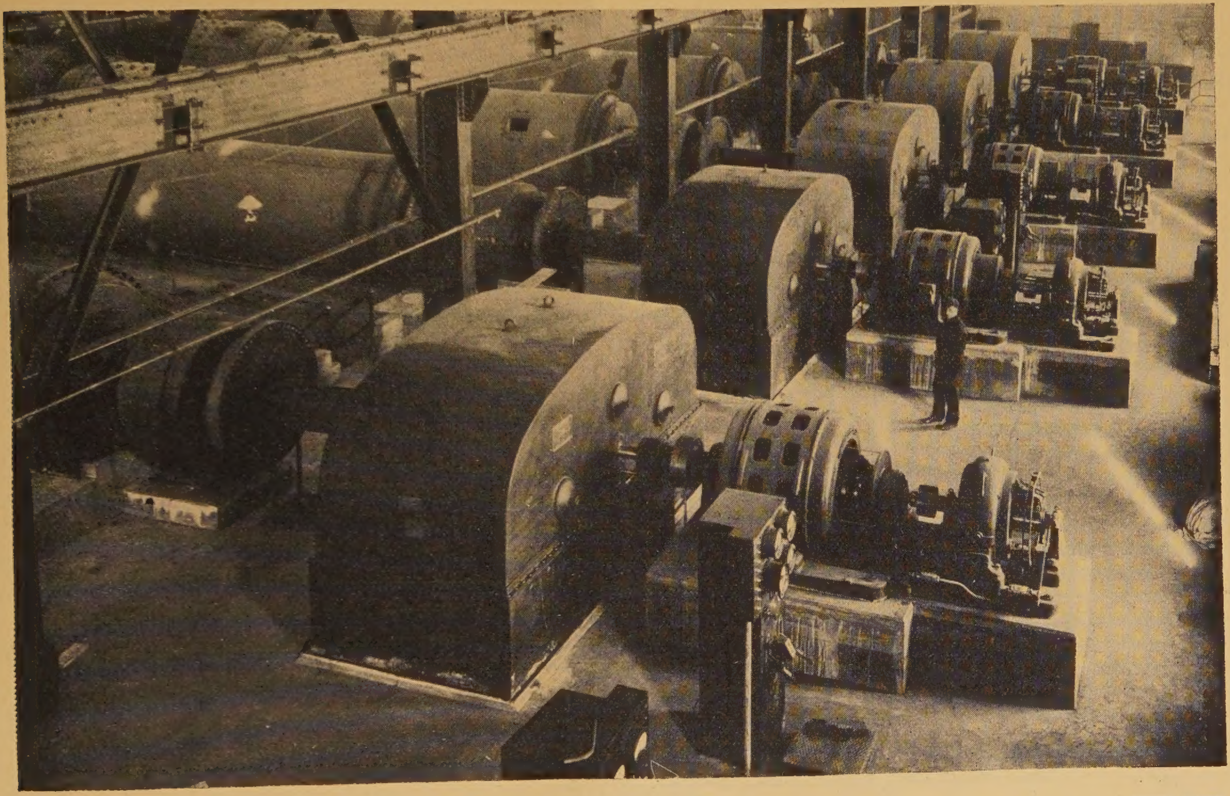
CEMENT MILL SECTION of
Concrete

UNI-KOM

GRINDING MACHINES WITH SYMETRO DRIVES



FLS **THE UNI-KOM*** is the latest development in grinding mills. It combines in one machine the Unidan mill with the Kominuter, the Kominuter section being ***overhung*** on the feed end of the Unidan section. A special type of slide shoe bearing is used for the trunnion between the two mill sections. **FLS**

The screen is internal and is located between the Kominuter and Unidan sections, the tailings being returned to the Kominuter for regrinding. Changing the size of screen and adapting the size of grinding bodies in each compartment to the grinding work required to give the necessary flexibility in the grinding operation.

This gives a mill having four grinding compartments and one screening compartment.

The motor is direct connected through the SYMETRO gear reduction unit to the outlet end of the Unidan mill section.

The advantages of this new mill are obvious. It combines in one machine all the benefits of the two-stage (ballmill and tubemill) grinding units with the advantages of the compartment mill. Larger pieces may be fed to it than to the straight shell, standard compartment mill, particularly on cement raw materials. Low installation cost and high efficiency are other advantages.

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Designers and Equippers of Cement Making Factories

CEMENT MILL SECTION of Concrete

The Cement Mill Edition of Concrete is edited exclusively for those interested in the manufacture of portland cement. Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition. The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

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Major Dust Losses in Dry Process Cement Plant Operation

Economies Made Through Installation of Sufficiently Large Dust Chambers Behind Dryers and Kilns—Cost Returned in Few Months

By **ALTON J. BLANK**
General Superintendent and Supervising Chemist,
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Puebla, Puebla, Mexico

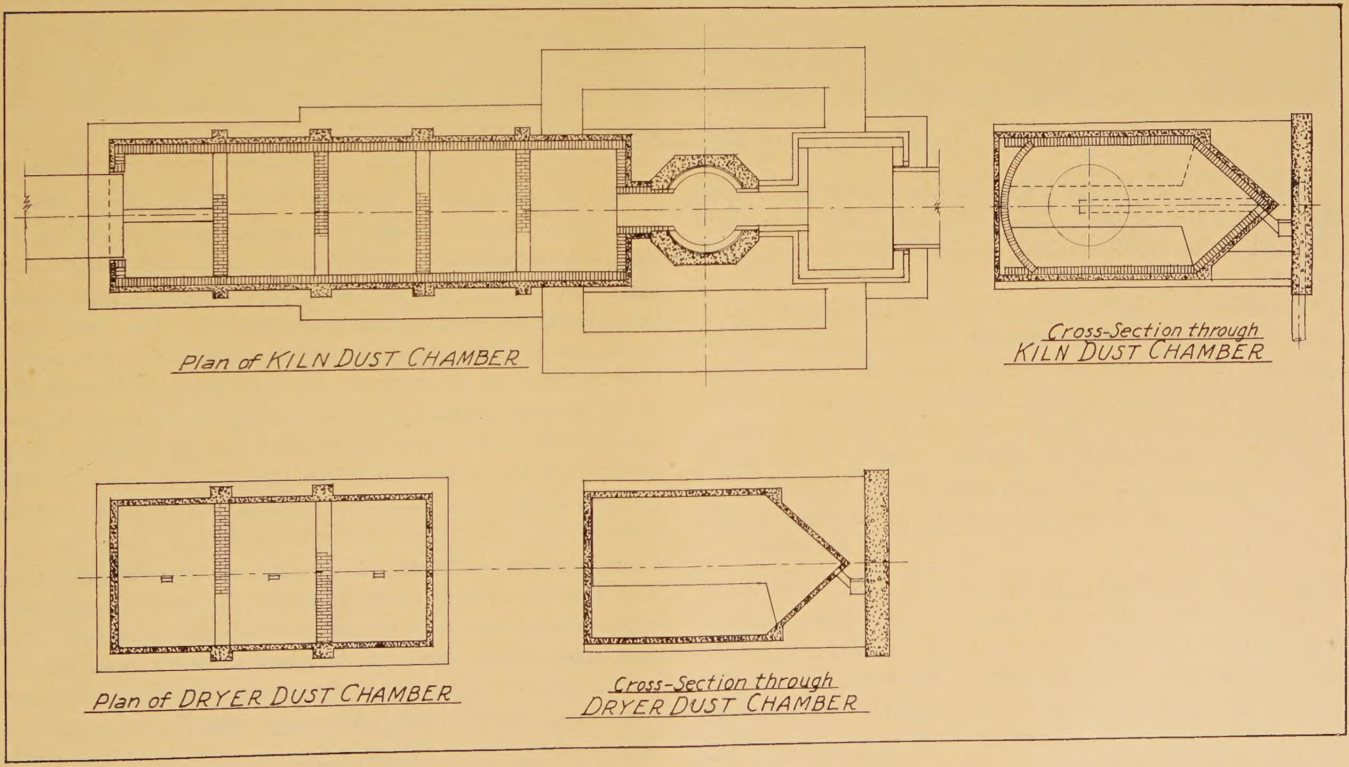
IN the drying of raw cement materials in the rotary dryer it has been the writer's experience that anywhere from two to ten per cent of the original material fed into the dryer is carried out of it by the waste gases, this depending to the greater extent upon the following conditions: (a) The size of the material fed into the dryer; (b) physical characteristics and specific gravity of the material; (c) the moisture content of the materials; (d) the length and diameter of the dryer; (e) the manner in which the materials traverse the length of the dryer; (f) speed of dryer; (g) draft at rear end; and (h) temperature of the waste dryer gases.

(1) THE DRYING OF RAW CEMENT MATERIALS

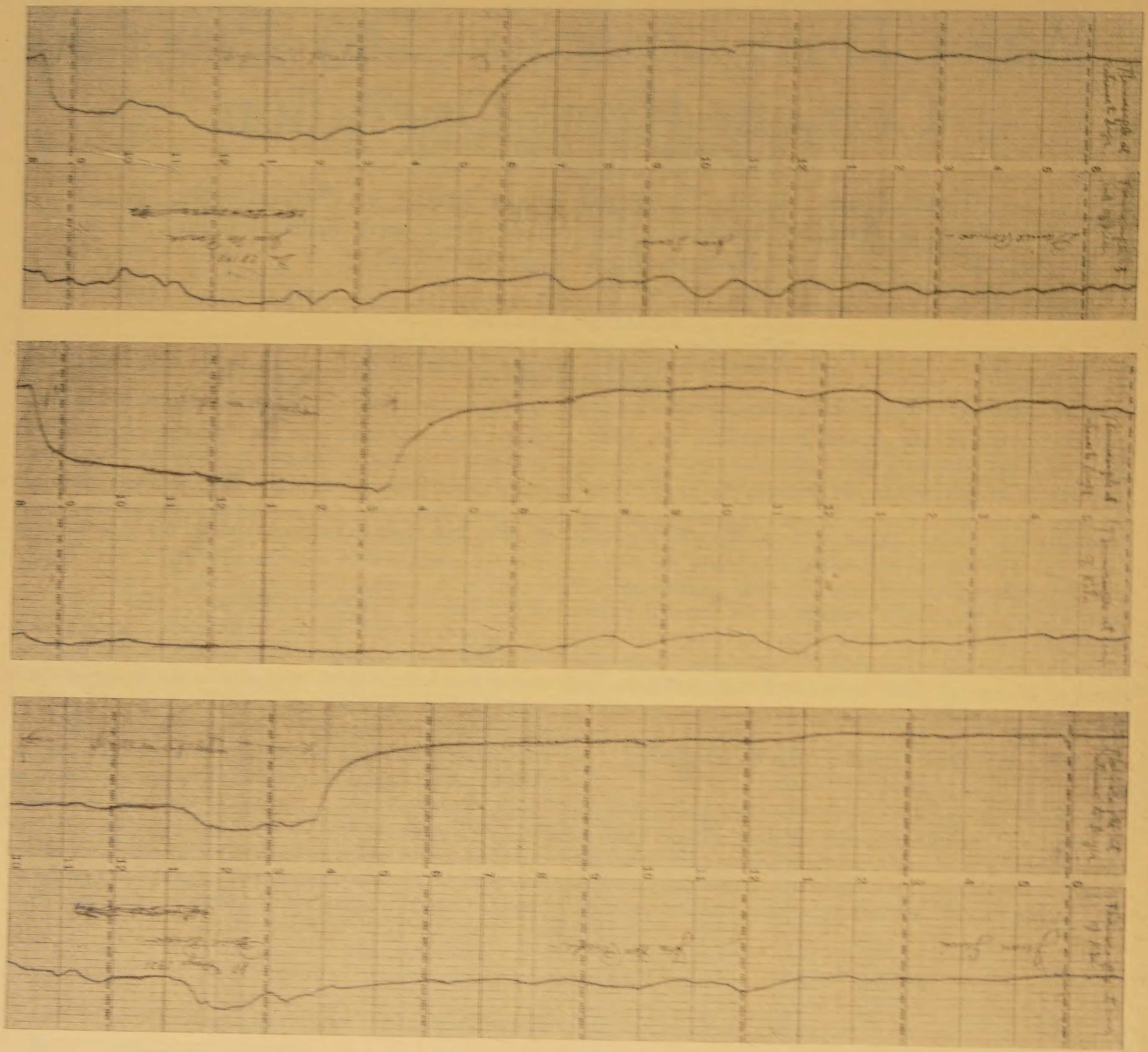
It has only been during recent years that any great deal of attention has been given to the dust losses in dryer installations, and in any number of plants where the raw materials are cheaply quarried and crushed, the question of dryer dust losses has been brought to the fore through efforts made to abate the dust nuisance, rather than through the necessity of economy. However, in any number of plants where the initial raw materials from the start have represented a large item in manufacturing costs, attention has been focused on methods for dust recovery from the standpoint of absolute necessity.

Amount of Dust Loss in Dryers

A number of years ago the writer made a study of dust losses at a plant where two 6 by 60-ft. direct-fired dryers operated on natural draft were used in the drying of from 1,000 to 1,500 tons of raw materials daily, and at that time certain interesting data were accumulated. The raw materials consisted of an ordinary limestone and an extremely tough shale, the combined moisture content of which ranged between 2 per cent during the dry season to as high as 6 per cent during the rainy season. These materials were crushed to sizes of 4 in. and down at the crushers and further reduced to 2 in. and down on being passed through a hammer mill. Proportioning was done


Plan of KILN DUST CHAMBER
Cross-Section through KILN DUST CHAMBER
Plan of DRYER DUST CHAMBER
Cross-Section through DRYER DUST CHAMBER

Plans and cross sections of kiln and dryer dust chambers



Temperature charts obtained in kiln and dryer tests

by means of poidometers. Moisture tests were made upon the mixture hourly before and after being sent to the dryers, and on several occasions fineness tests were made as well.

A check upon the tonnage of dust collected in the common dust chamber daily showed that approximately 2.5 per cent of the total amount of material fed the dryer was reclaimed, while judging from the appearance of the stack gases, together with the amount of dust that settled from these gases in the immediate vicinity of the plant, it was estimated that an additional 1 to 1.5 per cent of the total amount of material sent to the dryers escaped into the atmosphere.

High Dust Loss in Clay Dryer

Checks made upon dust losses in other dryer installations showed the highest dust loss to be in the neighborhood of 10 per cent of the total. However, in that particular installation a light, chalky material was utilized, while in several other plants the dust loss was found to average around 5 per cent.

At one other plant utilizing 5 by 40-ft. dryers where only the clay was dried, over a considerable period of time it was estimated that from 15 to 25 per cent of the clay was carried out of the dryers by the waste gases, there being no dust chamber installation. This clay, having a low specific gravity, being fine grained to the extent that as much as 50 per cent could be washed through the No. 100-mesh screen, and containing as high as 30 per cent moisture, at times necessitated excessive draft being carried on the dryers in order that sufficient fuel could be burned to insure complete drying. All of these factors contributed to the high dust losses.

In all dryer installations studied it was concluded that dust losses could be reduced to a minimum through the expenditure of a very small sum of money in the construction of dust chambers designed for each installation; and in practically all cases the economy in dust reclaimed could pay for the dust chamber installation within a period of one year, and in some instances in considerably less time than that.

(2) THE BURNING OF RAW CEMENT MIXTURES

In the burning of portland cement raw mixtures in the rotary kiln, it has been the writer's experience that anywhere from 4 to 12 per cent of the total amount of raw mixture fed into the kiln is carried out of it by the waste gases, this depending upon the following factors: (a) Fineness of raw mixture; (b) specific gravity of mixture; (c) length and diameter of kiln; (d) speed at which kiln is rotated; (e) whether operating upon natural or forced draft, and draft carried; (f) the temperature of the waste gases.

Greater development has been taken toward reclamation of the dust that escapes from the kiln with the waste gases than with reclamation of that dust which escapes from dryer installations. This has been due to the fact that prepared raw mixtures have approximately twice the value of the materials that are initially sent to the dryer.

Wasteful Effect of Forcing Kilns

Tests made by the writer some years ago at a plant utilizing 10 by 150-ft. kilns operating on natural draft and in connection with specially designed dust chambers showed that approximately 6 per cent of the total amount of raw mixtures fed the kilns was reclaimed in the dust chambers, though special tests made upon the stack gases showed an additional 4 per cent of the total mixture to be present in the waste gases. A further study of conditions showed that the dust loss of 4 per cent in the stack gases was due to the kilns being forced beyond their capacity, and upon operating the kilns for normal outputs it was found that the dust present in the waste stack gases was reduced to a minimum.

At other plants the writer has found that in each case where dust chambers are installed behind the kilns, dust losses, while not eliminated entirely, have been reduced to a minimum.

(3) A STUDY OF DUST LOSSES FROM DRYERS AND KILNS IN NEW INSTALLATIONS

A study has been made by the writer with the view of determining dust losses from dryers and kilns where new installations were designed to overcome deficiencies observed in the older installations.

Ratio of Raw Material to Clinker

In the older installations it was not possible to determine the individual dust losses of the dryers and the kilns. However, over a period of years it was found that 2.022 metric tons of raw materials were required for each metric ton of clinker produced.

Included in the older installation was one 6 by 70-ft. kiln operated on natural draft, behind which was located a 5 by 25-ft. dryer utilizing the waste kiln gases; also a 6 by 130-ft. kiln operated on forced draft behind which was situated a 5 by 25-ft. dryer. In each installation only small chambers were situated between the dryers and the kilns, and though the amount of dust collected was considerable, it is doubtful whether it amounted to more than 20 per cent of the total amount of dust carried out of the dryers and kilns by the waste gases.

In the newer installation of kiln and dryer, dust chambers were designed to reclaim any dust that escaped with the waste gases, and a study of the results obtained over a period of months has shown them to be highly efficient. Where formerly 2.022 metric tons of raw materials were required for each metric ton of clinker produced, the amount of materials has been reduced to 1.522 metric tons of raw materials per metric ton of clinker burned.

Testing a New Installation

Tests were made upon the dryer installation. The 8 by 75-ft. dryer in use was outfitted with a series of lifters for the first 50 ft. from the feed end, and for the remaining distance was lined with 6-in. brick. The materials fed the dryer consisted of both soft and hard limestones and a hard shale of volcanic gravel characteristics, these materials being crushed separately to sizes of 2 in. and down, after which they were passed to a hammer mill and further reduced in size to 1 in. and down. The materials were proportioned by poidometers and fed to the dryer by means of an elevator-chute arrangement. Fineness of the materials leaving the crushers is as follows:

Screen No.	Per cent retained
1½-in.	28.6
¾-in.	77.2
⅜-in.	90.8
No. 4	95.8
No. 8	98.0
No. 48	99.2

Fineness of the materials on leaving the hammer mill is as follows:

Screen No.	Per cent retained
1½-in.	0.00
¾-in.	20.8
⅜-in.	52.8
No. 4	76.0
No. 8	80.2
No. 48	97.0

The moisture content of the materials was, roughly, 3 per cent; and since the dryer operating on waste heat from the kiln, furnished by means of an exhaust fan, was not rushed for capacity, the tonnage averaged 15 metric tons per hour. A number of short 10-hr. tests revealed that in the drying of 150 metric tons of materials, 5.5 metric tons of dust were collected in the three-compartment dryer dust chamber situated between the dryer and the exhaust fan.

Fineness tests made upon this dust showed the following:

	Averages	
	Per Cent Passing No. 100 Mesh	Per Cent Passing No. 200 Mesh
Dust chamber No. 1	70.0	42.2
Dust chamber No. 2	92.4	68.8
Dust chamber No. 3	98.7	88.5

Calcium oxide tests on the dust showed the following:

	Averages Per Cent CaO in Reclaimed Dust
Dust chamber No. 1	35.12
Dust chamber No. 2	38.70
Dust chamber No. 3	40.51

Tests made upon the kiln installation were as follows: The 8 by 130-ft. kiln in use was lined for the first 90 ft. from the feed end with 6-in. ordinary red clay brick, and for the remaining distance to the discharge end with 6-in. high-alumina liners. When operating alone, the kiln draft was furnished by means of a 150-ft. stack with a damper situated some 10 ft. from the top, and operated. With the dryer in operation the stack was dampered off as required, and draft was furnished by the dryer exhaust fan. Behind the kiln was situated a five-compartment dust chamber, and daily reclamation of the dust collected shows the first three compartments of the chamber to be heavily charged with dust, while the remaining two compartments, together with the base of the stack, show the lesser amounts.

Tests made upon the collected dust are as follows:

	Fineness Averages	
	Per Cent Passing No. 100 Mesh	Per Cent Passing No. 200 Mesh
Dust chamber No. 1	98.0	82.0
Dust chamber No. 2	98.2	82.3
Dust chamber No. 3	99.5	84.0
Dust chamber No. 4	99.8	89.0
Dust chamber No. 5	100.0	90.2
Kiln Stack	100.0	96.0

Calcium oxide tests on the dust collected showed the following:

	Averages Per Cent CaO in Reclaimed Dust
Dust chamber No. 1	51.20
Dust chamber No. 2	54.64
Dust chamber No. 3	55.39
Dust chamber No. 4	56.57
Dust chamber No. 5	57.14
Kiln Stack	57.32

A conveying system takes the dust collected in the first dryer chamber to the mills, while that dust collected in the remaining two chambers is conveyed and mixed in with the dust reclaimed from the kiln dust chamber system, which in turn feeds into the conveyor that takes the raw mixture to the kiln storage tank.

Dust Chambers Soon Pay for Themselves

A study made of both dryer and kiln dust chamber installation costs, when compared with the savings in reclaimed dust that would otherwise be lost, shows that these dust chambers pay for themselves after only a few months' operations. While they may not show 100 per cent efficiency in the collection of dust from waste gases, their initial low cost and high returns make them the most attractive investment to be found in cement plant installations.

Iola, Kansas, Plant Inaugurates Six-Hour Day Basis

A six-hour working basis was inaugurated on September 14, at the Iola, Kans., plant of the Lehigh Portland Cement Co.

Instead of three 8-hour shifts, the plant is operated with four 6-hour shifts. No men were laid off.

1931 Canada Cement Earnings Expected to Equal 1930

Business of the Canada Cement Co. has held up well this year, and earnings are likely to equal, or nearly so, those of 1930. Construction work, being undertaken by city governments and provincial governments as part of the dominion-wide efforts to relieve unemployment, has helped to maintain demand. At the same time, important orders have been received from a number of large power developments under way in Canada, and the construction of the new Canadian National Railways terminal at Montreal has required a share of the production.

Small orders and retail business have, like last year, been relatively low.

Knoxville, Tennessee, Plant Running at Capacity

Demand is keeping the Volunteer Portland Cement Co. plant at Knoxville, Tenn., running at practically capacity, according to C. F. Lewis, general manager.

"Our operations are almost at capacity," Mr. Lewis said on September 26. "At present we are producing some 2,700 barrels every day. This enables us to employ upward of 130 workmen regularly."

With the exception of the kilns and quarries, all departments are operating 24 hours a day on a six-day week.

55,000 Barrels in Day Set New Record at La Salle Plant

Fifty-five thousand barrels of cement were produced at the Marquette Cement Manufacturing Plant at La Salle, Ill., on Saturday, October 3. This is the largest amount to be made in any one day in the history of the plant, according to T. G. Dickinson, president.

"If good weather continues, the present year will be the greatest in our history," Mr. Dickinson asserted during his visit to the plant on October 6.

Portland, Colorado, Plant Reopens for Winter Run

One hundred men returned to work at the Portland, Colorado, plant of the Colorado Portland Cement Co., on Oct. 1, when the plant reopened after being closed since July.

The run is expected to last for several months and perhaps extend through the winter.

Riverside Anticipates Continuous Winter Operation

The Riverside Cement Co. plant at Riverside, Calif., resumed operations on October 1, with between 200 and 300 men working.

The plant had been shut down since July 1 and it is hoped to keep the plant in operation during the entire winter.

Facts About Russian Cement Plants Told by American Engineer

Ambitious Plant Construction Program, But Little Actual Accomplishment — Unfinished Plants Lack Machinery — How Uninformed Officials Mutilate Well-Designed Plans—Cement of Poor Quality

In this remarkable story we have the privilege of giving American cement manufacturers the facts about the portland cement industry in Russia.

The author of this article is an American engineer who is a specialist in cement mill design, construction and operation, and who has just returned from Russia after spending nearly two years in that country.

His story will enable American cement manufacturers to draw rather definite conclusions as to the probable extent of competition from Russian sources.—The Editors.

TO attain the proper perspective for a study of any industry in Russia it is necessary to review the conditions under which these industries have been developed. Practically all industries in Russia have been built up by foreign capital and foreign engineers, using Russian workmen. The Russian engineer is a very intensely theoretical student, but lacks the practical adaptability which has been so necessary in developing the American industries.

In the early history of Russia, Englishmen, Germans, and Italians have been very largely instrumental in developing construction, trade, and industry. At a later period, French influence has been felt, with some assistance from other countries of Europe. In the last few years prior to the World War, American capital and American engineers began what promised to be a great economic revival and industrialization of Russia. However, the World War, followed by the Russian revolution, terminated this era.

The manufacture of cement in Russia prior to the war was largely conducted in the area which is now included in Poland, in the Ukraine and in the Volga regions, with a number of small plants scattered throughout the balance of the country.

Russian Cement Market Almost Unlimited

A general characteristic of all European manufacture is the small scale operation which is necessary, due to the limited market for any industry without crossing a frontier. For this reason there is little necessity for extremely large plants or the large manufacturing units which our American plants have adopted in recent years. Russia, on the contrary, is a very large country and an undeveloped country in which increased production is needed in every conceivable industrial product.

The potential markets for cement are practically unlimited. The Soviet government, after it had passed through the famine period, recognized that it must rebuild the industries which it had destroyed. Thus the program for economic development which had been terminated by the war and revolution was renewed. The five-year plan was worked out and large sums of money were assigned for the development of the heavy industries, portland cement among the rest.

Clay pits at Russian cement plant at Fokino. Observe debris lying around

Under the present Soviet organization of highly centralized industries a trust known as the Censtroy was formed to take over the design, construction and operation of all cement plants in Russia. Under this directing trust, several subsidiary trusts were formed to carry on these various functions.

Geological Surveys Unreliable

Geological surveys were made of all favorable plant sites. These surveys were made by a central organization which is designed to carry on all geological investigations. The chemical analysis and geological structure of all samples are determined in central laboratories in Moscow for the entire country. This makes the investigation of any particular project very slow, due to the immense amount of work carried on by the central laboratories with a very poorly organized personnel, mainly professors who seem to be intensely jealous of each other. The result is that much of their energy is spent in proving that some one else has made an incorrect deduction. Many of the analyses and reports from the central geological bureau and the central laboratories are in such shape that foreign engineers have great difficulty in checking results, whereupon they are casually informed that they are here to build cement plants and not to check the work of these other people. Thus great inconsistencies are encountered in all the plans.

Adopt Ambitious Plant Construction Program

The requirements for cement to complete the building program reach fabulous figures. To meet this demand it was determined to expand the industry very rapidly. In a characteristically Russian manner orders were issued to make plans for a number of extremely large plants, and all existing plants were considered as obsolete, to be replaced at an early date. Briefly summarized, the program adopted for the five-year plan called for the installation of manufacturing capacity to produce 100,000,000 barrels per year at the end of the five-year plan. When one considers the 14,000,000 barrels produced in the year 1928 it is perfectly obvious that the enthusiasts had been allowed to run away with the program. Immediate requirements necessitated enlarging the capacity of existing plants before commencing the work on the very large plants. This was done to a limited extent. Actually, one new plant in Armenia was constructed in 1930 with a capacity of about 750,000 barrels per year, and additions to existing plants during the years 1929 and 1930 increased potential manufacturing capacity about 2,000,000 barrels, although the actual figures are very difficult to confirm.

Incompleted Plants Lack Machinery

A large corps of engineers located in Leningrad and Moscow began the design of a series of very large plants during the latter part of 1929 and the early part of 1930. However, the funds in foreign currency did not appear to be available, as very little machinery was actually bought until the latter part of the year 1930, and some in the first half of 1931. A large amount of this money was spent for foreign machinery for the enlargements to the plants at Fokino, Podolsk, and for the Gigant plant, about 80 kilometers from Moscow. Many other plants have been projected, with a certain amount of work done which could be covered by ruble expenditures, but machinery (which must be paid for in foreign currencies) is lacking.

Those Russian Statistics

In evaluating any data from Russia a great deal of conservatism must be used to avoid accepting as accomplished facts the estimates prepared by those who are enthusiastically and hopefully convinced that the program will be completed as rapidly as scheduled. Engineers experienced in handling Russian statistics have learned that figures presented as actual accomplishments are frequently only the estimate of what is hoped to be done. Thus we learn to discount very greatly the claims as reported by the various Russian organizations.

In the early part of the year 1930 an order was promulgated by the Supreme Economic Council of the Silicates Industry that 10 per cent diatomaceous earth should be added to all clinker before being ground. This order resulted in some very peculiar results. In many of the plants the Red director and those in charge of the plants were former cement plant workers with little real technical ability, and this order was probably not properly understood. Therefore, various substances, and very frequently the quarry overburden material, were used in this way. Also, the determination of the 10 per cent was accomplished in a rather crude manner, mainly by shoveling the material onto the conveyor leading to the grinding mills. The natural results were undoubtedly a very uncertain quality of cement. However, like most Soviet reports coming from central organizations, the quality reported was quite uniform.

Good Raw Materials Available

The raw materials for some of the cement plants in Russia are extremely good. The deposits near Briansk have chalk and clay which should combine to make a very high quality and low cost product. However, with the type of organization adopted in the plants, low costs are not possible.

Plant Organization Is Technical, Social and Military

The organization of a cement plant in Russia includes many features which are entirely foreign to the operating organization in an American plant. Two distinct organizations are maintained, the operating personnel and the so-called social organization. The management of the plant is entirely under the jurisdiction of the Red director, who may or may not have any personal knowledge of the operations conducted under his direction. He is supreme authority and is placed by the central organizations to see particularly that no actions are taken contrary to the wishes of the peasants' and workers' councils. He also reports to the Supreme Economic Council of the Silicates Industry.

The technical director has charge of all technical operations and under him come the operating, the mechanical and the chemical organizations. He is the real plant superintendent, but his powers are always limited by the supervision of the Red director and the Soviets of the workers in the factory.

The social organization covers the so-called social education of the workers, the supervision of the living conditions of the workers, and the stores, housing, and amusements provided for them. One very important feature of the organization is the military guard which one finds in each industrial plant in Russia. It reminds one of war times to be stopped when approaching a cement plant by a guard of several industrial militia with fixed bayonet, who demand passes before allowing one to enter. The average cement plant must support a military guard of 30 to 50 men.

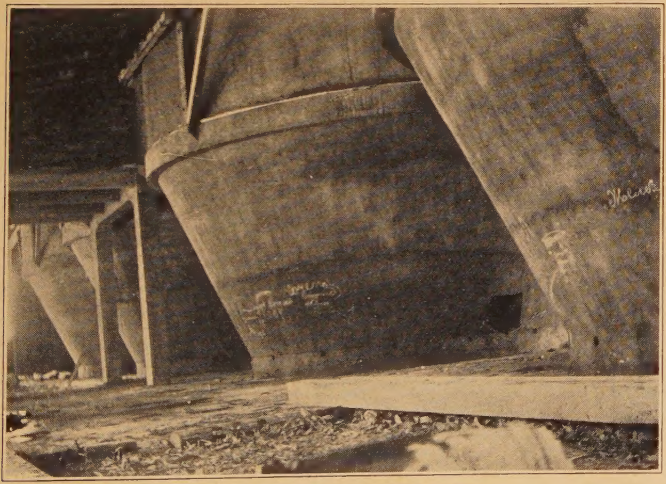
Meddlesome Officials Change Well-Designed Plans

It was the expectation of the American engineers going to Russia that recent improvements in equipment would be adopted in the new plants to be constructed. However, we find that contrary to general belief an extreme conservatism is quite evident in all the designs which were finally accepted.

The American engineers were closely questioned on all improvements in machinery and processes, but very few of these new developments were incorporated into the plants actually built. The tendency to follow the older European types of design was very strong. On the high councils many of those who enjoyed authority showed a practical familiarity with this older type of cement plant and expressed extreme doubt as to the practicability of adopting modern American designs. Thus plants of large capacity were designed with small units and line shaft drives, and arrangements more suitable for small plants. Plans which had been carefully worked out from an engineer's point of view were criticized in great detail in these councils and changed with no apparent reason, except that the council seemed to feel that in some way, by making these changes, it was justifying its existence. Thus plans were presented and changed many times before being approved. When the plans had been finally approved it was frequently found that no foreign currency was available to construct the plants.

Distrust Obstructs Preparation of Plans

Engineers going to Russia to design plants are expected to bring great masses of detail to prove every point of their design. More time is devoted to proving the correctness of the design than is necessary to make the design. This is probably due to the absolute distrust that prevails among the Russians themselves. Apparently they do not trust themselves or anyone else. Consequently, until each detail has been proved to the satisfaction of every one who can bring up anything to criticize, nothing is actually done. Plans may be criticized and stopped by any one, even those in very minor positions. With the large number of plans on hand, however, there is no lack of work, for when one plan is stopped another immediately takes its place.



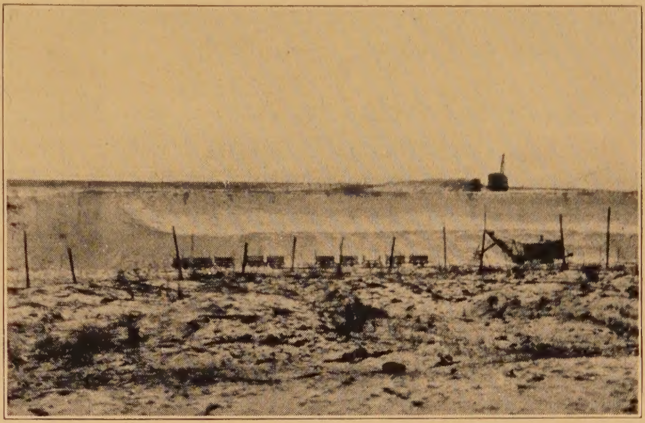
Cement silos for barrel machines

Russian Engineers Lack Experience

The native Russian engineers available for making plans and preparing reports are far more numerous than could be hoped for in designing plants in America. Very few of them have any practical experience, and many have only very sketchy technical education. Far more drawings are made than would be expected in the design of an American plant. Detailed reports of every nature are made up and discussed at great length in the various councils. Thus the engineer in Russia will devote the greater portion of his time to preparing reports and alternate designs, and in defending his position before the numerous commissions, while the actual construction lies dormant.

Safety Measures Sadly Neglected

Regarding the safety and welfare of workers, along the lines in which much has been accomplished in American plants, these features are sadly neglected. In passing through the operating plants in Russia today, one is constantly reminded of the dangerous conditions existing, such as unguarded belts, gears, and pulleys, insufficient and inadequately placed lighting, poorly constructed runways and stairways. Accumulations of worn out parts, broken lumber and dirt clutter up vacant space in all directions. This is one feature which would naturally be expected to receive consideration in a country where the workers are nominally in control of the factories; but it would seem in this land of the proletariat that less consideration is given to the health of the worker and his working conditions than in any of the capitalistic countries. Accidents and casualties as a result are far higher than would be tolerated in any other country.



Chalk deposit supplying enlarged Russian cement plant at Fokino requires no blasting. Ideal wash mill material

Many Good Natural Deposits Neglected

In conclusion, Russia has many deposits of materials for making high class cement at a reasonable cost. Russia has a large demand which can consume all of the cement which she can conceivably manufacture. Russia has many engineers and workers who are earnestly trying to upbuild the cement industry. Against these advantages, the present form of organization is such that very little can be accomplished in the way of actual increase in productive capacity. The money which is being expended is producing a pitifully small increase in production. Machinery is being worn out about as rapidly as new equipment is being installed. The actual quality of cement manufactured is highly questionable. Many of the deposits which are being developed are of quite an unfavorable nature, whereas many other deposits of good materials are being neglected because they do not lie in the proper political divisions.

Russia As an Exporter of Cement

As a factor in world markets Russia may be expected to export, and undoubtedly is exporting, some cement into China, Manchuria, Persia and through the Black Sea into the Mediterranean. Russia expects to export large amounts of cement, particularly to South America, through the Black Sea, from Leningrad and from the Pacific coast. The Russian engineers talk high-quality cement, but the cements which have come under the observation of the writer have been very poor in quality. The amount of cement available for export is comparatively small and will undoubtedly remain so as the domestic requirements are increasing. While these demands may be satisfied with promises for a limited period, eventually they must be satisfied with cement.

Universal Atlas to Add Two More Kilns at Buffington Plant

Rumors that the Universal Atlas plant at Buffington, Ind., was to shut down were emphatically denied by operating officials when installation work on the new dust collecting system slowed up production, according to the *Calumet News* of September 29.

Instead, it was stated, "We have four kilns running now, and we intend to add two more kilns next week. We expect to continue our usual fall and winter production schedule, with some allowance for the depression. When the dust collecting equipment is in, we will have 14 kilns. We are now operating the plant at about 30 per cent of capacity."

Lone Star Texas Gets Panama Canal Contract for 50,000 Barrels of Cement

The Lone Star Cement Co., Dallas, Texas, has received a contract for delivering 50,000 barrels of cement to Cristobal, Canal Zone. This is said to be the first time in a year that a Panama Canal cement purchase has been awarded to a southern bidder.

Rotary Kiln Across Railroad

Installation of New Long Kiln at Glens Falls Plant Called for Heroic Engineering

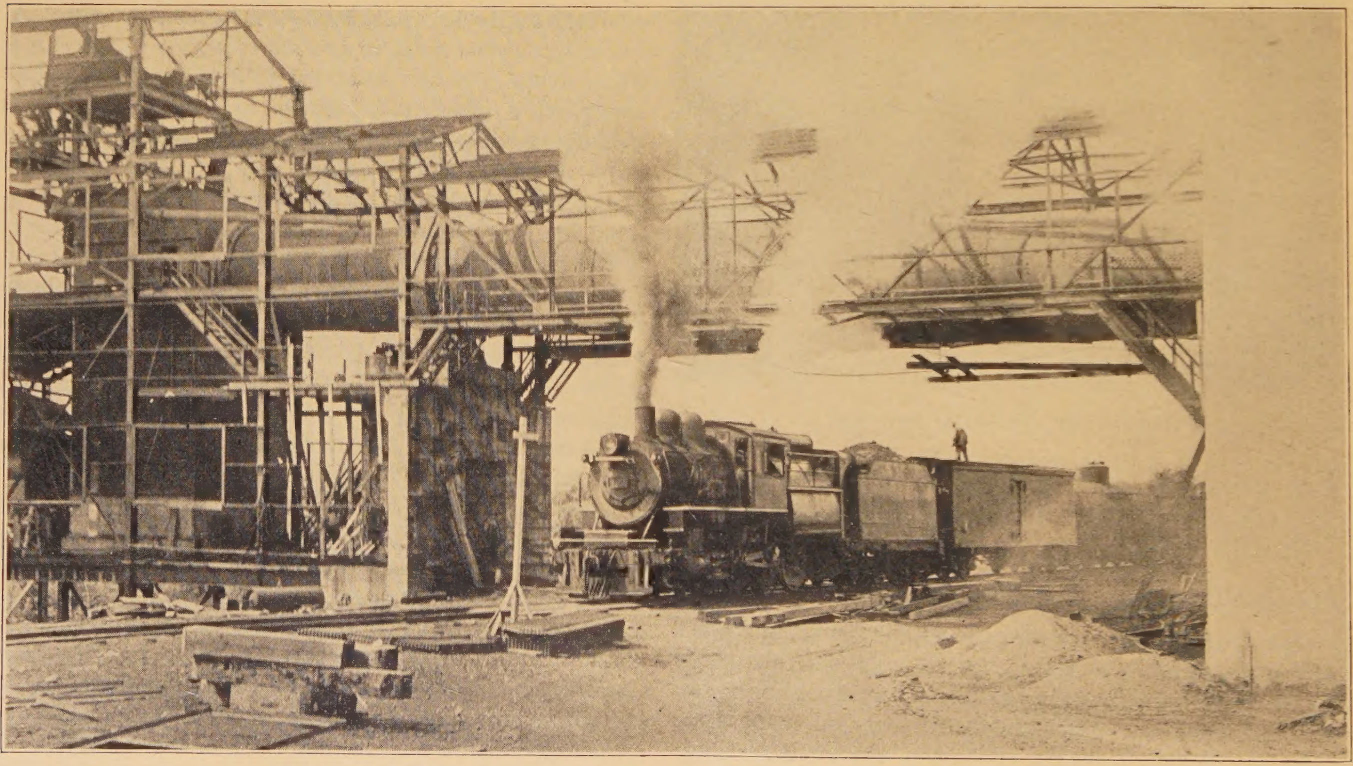
The accompanying photograph is a striking example of the efforts made by prominent experienced cement mill operators to meet the present business depression and low prices by the installation of modern equipment to reduce their operating costs.

The Unax kiln shown is 382 ft. long and is installed with the intent of replacing four 120-ft. long kilns to improve the efficiency of the plant.

On account of the greater length, it extends a considerable distance beyond the present kilns (whose stacks are partly visible on the right of the illustration) and crosses a main freight line on which a freight train can be seen passing under full steam. In addition, the stack and dust chamber are built up from the old quarry floor, which is about 40 ft. below grade, showing the difficulties encountered and overcome by operators and engineers when installing new equipment.

The Unax kiln with its appurtenances was furnished by F. L. Smidth & Company of New York, who also did the engineering of the installation. The plant in question is the factory of the Glens Falls Portland Cement Company at Glens Falls, N. Y.

The kiln was placed in operation September 26 and its performance is entirely satisfactory.



Rotary kiln 382 ft. long replaces four 120-ft. kilns at Glens Falls plant

EDITORIAL

Expert Manufacturers and Amateur Salesmen

"IT has been my observation that the operating departments of cement companies are far more efficient than the sales departments.

"Perhaps we know more about manufacturing than any other side of our business, but it is wrong to assume that economies to be effected in manufacturing costs are greater than those to be obtained in other branches, as in marketing, for example. Furthermore, a mistake in judgment in operation is less costly than a similar error in connection with merchandising.

"From the foregoing you may gather the impression that in my opinion we in the cement business are expert manufacturers and amateur salesmen. Certainly we can well afford to do a better job of selling than past performance has demonstrated."

The foregoing indictment of sales methods and practices in the cement industry comes from a cement company executive who has been in the industry for many years and has seen it from all sides.

There is little question that he has made an accurate estimate of the situation. Granting this to be true, the industry has had a one-sided development. In a word, marked progress has been made in the improvement of processes and the reduction of manufacturing costs, but there has been no corresponding progress in merchandising.

The lack of improved merchandising methods has been demonstrated in most pronounced fashion in the failure of American cement manufacturers to make any headway in the Latin-American market. Interesting facts pointing to some of the causes for this failure are now being brought to light in a series of special circulars issued by the U. S. Bureau of Foreign and Domestic Commerce, under the general heading of "Cement Markets of the Western Hemisphere."

In one South American country where the United States held the lead in cement imports up to the end of 1923, the imports from this country are now less than one-twentieth of those from the leading country. The stories from other countries are much the same, differing only in their details.

The causes for the loss of these markets are not hard to find. In one report the writer points out that European importers have provided warehouse storage facilities for cement shipments, while American importers have not. In that same country consumers prefer cement in 400-lb. barrels instead of in bags. European manufacturers supply the product in barrels, while American manufacturers do not. Another writer from a South American country mentions the fact that in frequent cases the representatives of American cement companies are unable to speak the native language, whereas European manufacturers' representatives invariably speak the language without difficulty.

In practically all countries thus far reported, the price of American-made cement is higher, and in one case twice as high, as the price of cement from other foreign countries. This handicap is an almost insurmountable obstacle in a market which, as one writer expresses it, is not a quality market, but one in which price is a controlling factor.

The Latin-American market may never be a large market, but it is large enough to justify some serious thinking and planning.

Long-Range Planning

"IF long-range planning is one of the developments resulting from the lessons of our present troubles, obsolescence will in the near future supply its unfailing market. It will not be the market of the make-over or repair man. It will be the market arising from the total elimination of whatever is out of date."

The foregoing quotation is from an address by Truman S. Morgan, president of the F. W. Dodge Corporation. He was speaking more especially of the construction of buildings and building accessories; but his words have an equally specific meaning when applied to the cement industry.

If long-range planning is one of the developments resulting from the present troubles of industry in general and the cement industry in particular, some of the cement plants that continue to operate with processes and equipment that are even now out of date will need a complete rehabilitation if they are to remain as a factor in cement production.

Where Safety Predominates

A CORRESPONDENT recently reported an accident from the La Salle plant of the Alpha Portland Cement Co. which broke a safety record that had continued for 760 days without a lost-time accident.

"All the employes are keenly disappointed because of the accident," the correspondent continued, "but they feel that the 760-day record is something for them to shoot at. They have started all over again with a determination to beat that record."

When employes have reached this frame of mind it means that the idea of safety has been driven home. The entire cement industry wishes them success in their new safety drive.

Install Shaft and Rotary Kilns in Swiss Cement Plants

New Type of Shaft Kiln Avoids Briquetting—Fuel Consumption Is Low—Entire Plant Equipment Tuned Up to High Efficiency

By F. F. TIPPMANN

An article in the September Cement Mill Section of *Concrete*, pages 59 to 63, told of European experiments with burning cement on a traveling grate.

The October issue, pages 62 to 65, described the manufacture of high-strength cement in a reconstructed cement plant in Spain, in which modernized vertical kilns are employed.

The article that follows describes a new cement plant in Switzerland, in which one rotary and two shaft kilns have been installed, with the object of dealing economically with periodic variations in demand. The shaft kilns employed, which dispense with the necessity of briquetting the raw meal, are another recent European development. — The Editors.

IN 1928 the Swiss company, Portland Zementwerke Hausen, A.G.,* established a new portland cement works at Hausen, near Brugg (Canton of Aargau) in the Swiss Jura, which district contains inexhaustible supplies of raw materials suited for the manufacture of high-strength portland cement. This installation was carried out in its entirety by the well-known firm of Andreas Maschinenbau, G.m.b.H.,† of Munster, in Westphalia. The works have been planned for an initial daily output of 500 tons, but provision has been made for the future doubling of this output. Figure 2 shows the plant in plan and section. A combination of shaft and rotary kilns was adopted with the object of dealing economically with periodic variations in demand.

Shaft Kiln Avoids Briquetting

Since the Andreas shaft kiln (which avoids briquetting of the raw materials) became an economic rival to the rotary kiln, a number of new, and even certain old rotary plants, have decided to install this combined process. The kilns installed in the new works are the Andreas high-efficiency shaft kiln and rotary kiln. Construction was commenced on October 4, 1928, and in spite of a hard winter the works was in full production at the beginning of August, 1929. Figure 1 shows the completed works from the railway.

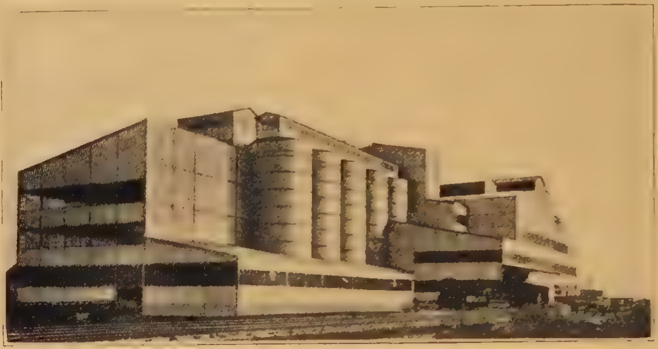


Figure 1. Completed cement plant of the Portland Zementwerke Hausen, A. G., at Hausen, Switzerland, from the railway side

Crushing and Handling of Raw Material

The raw materials are a hard high-lime Jura limestone and a medium hard Jura marl of varying lime content. The latter is worked in layers and conveyed to the works by a double-track rope-railway passing through a tunnel. The trucks of raw material are emptied by inverting them in an automatic rotary tipping machine and their contents conveyed by a conveyor to a hammer crusher. This machine is capable of crushing blocks up to 5 ft. in diameter,

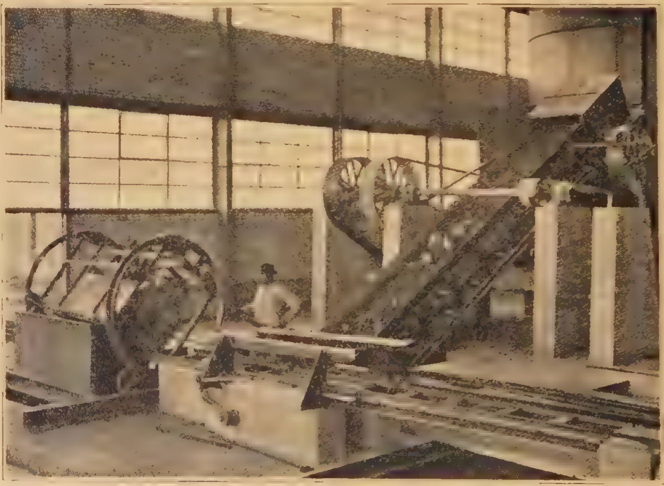


Figure 3. The preliminary crushing plant

From *Cement and Cement Manufacture* (London), August, 1931.

*Now controlled by the Swiss Cement Syndicate.

†This firm has now amalgamated, as regards its cement-making machinery, with Krupp-Grusonwerk, A.G., Magdeburg-Buckau.

delivering pieces the size of a hazelnut, and has an output of 100 tons per hour. It can thus deal with the daily requirement of 800 tons of raw material in an 8-hour shift. Figure 3 shows the preliminary crushing plant.

The crushed raw materials are stored in three silos of a total capacity of 900 cu. yd. These silos are discharged by an Andreas plate discharge (Figure 4). At this stage the laboratory staff roughly adjusts the raw material mix. The construction of the silo-discharge allows the silos to be arranged side by side, so that the plate apparatus, combined with the constant head of material, insures uniform discharge, which is of decisive importance in maintaining

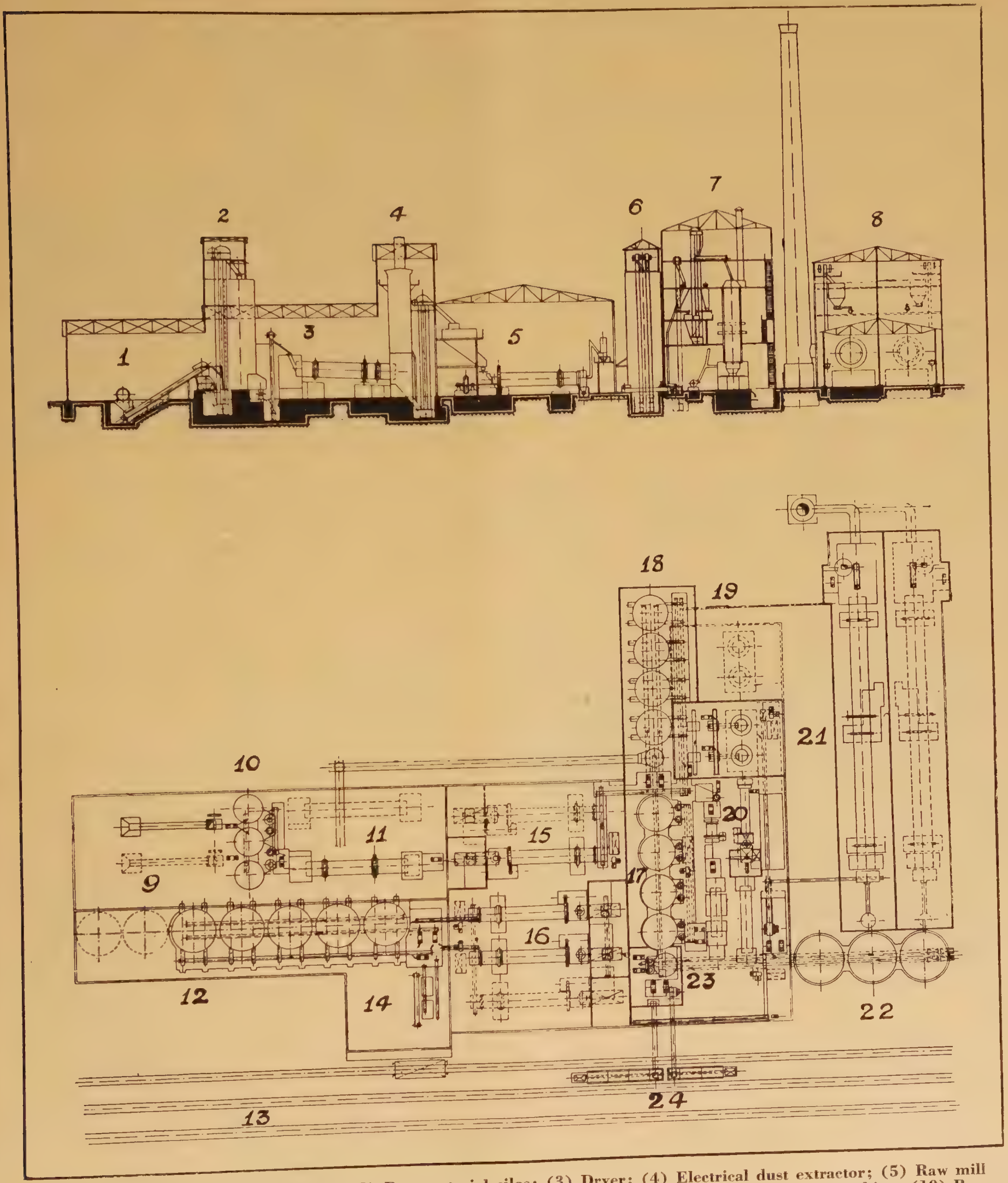


Figure 2. (1) Preliminary crushing; (2) Raw material silos; (3) Dryer; (4) Electrical dust extractor; (5) Raw mill and cement mills; (6) Raw meal mixing silos; (7) Shaft kiln; (8) Rotary kiln; (9) Preliminary crushing; (10) Raw material silos; (11) Dryer; (12) Cement silos; (13) Railroad sidings; (14) Packing; (15) Raw mills; (16) Cement mills; (17) Coal silos; (18) Raw meal mixing silos; (19) Shaft kiln; (20) Coal grinding; (21) Rotary kiln; (22) Clinker silos; (23) Gypsum silo; (24) Coal and gypsum bunkers

the composition of the lime-marl mix sufficiently constant. This type of silo discharge is provided throughout the works (e. g., for raw mill and cement mill feed silos, coal and gypsum silos), wherever coarse or granular materials are concerned.

The lime-marl mix obtained from the raw silos is led to a rotary dryer employing the Andreas cellular construction. This dryer possesses excellent heat efficiency. It is fitted with an electrical shaft dust-extracting plant.

Raw Mill Operates at Night

The dried mix then passes to the raw mill feed bunker. The raw mill is an Andreas high-output three-compartment compound mill of 7.2 ft. diameter and 46 ft. long. The hourly output is 60 tons of raw meal of 12 to 14 per cent residue on the 180-mesh per inch sieve; i. e., 165 lb. per (metric) horsepower hour. Thus the daily consumption of raw meal (800 tons) can be supplied by a single mill unit working during the night only, enabling advantage to be taken of the cheaper night rate for power. Indeed, with the exception of the kilns themselves the arrangements are such that the entire plant only operates for 8 or 12 hours daily while cheap night power is available.

The raw mill and cement mills are driven by low-speed electro-motors provided with idle current compensation. These combine simplicity and reliability with the economy in power and efficiency of high-speed motors working through reduction gear. The raw meal is conveyed to the mixing silos, which consist of four units with a total capacity of 2,850 cu. yd. The blending of the raw meal is carried out by the whirling process, and is so thorough that variations in the $CaCO_3$ content amount to barely 0.3 per cent.

The raw meal and cement silos are emptied by means of a double chain discharge, which enables the silos to be more simply and cheaply constructed.

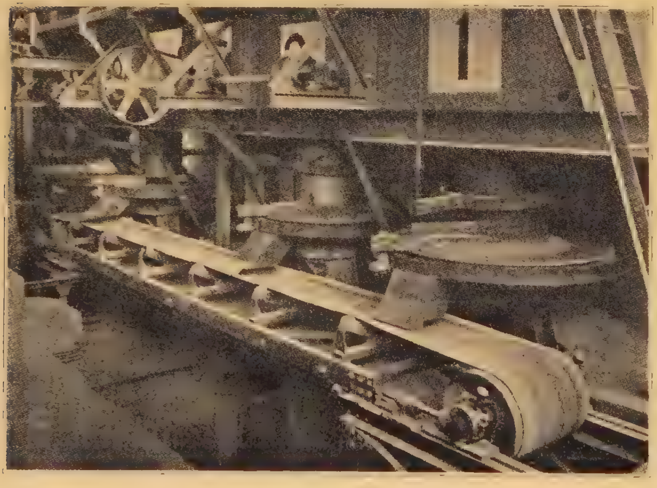


Figure 4. Raw material silos are discharged by a plate discharge

The Shaft Kilns and Their Product

The blended raw meal is next conveyed to the kilns, of which the shaft kiln first will be briefly described. The original plant comprised two shaft kilns of 8.25 ft. diameter and 33 ft. high. The raw meal and fuel (anthracite slack) are weighed simultaneously in an automatic coupled weighing machine. The mixture is then moistened in a special mixing screw, thoroughly mixed, and introduced directly into the kiln by a special feed without briquetting or moulding. The kiln is characterized by the fact that there is no adhesion of the material to the kiln lining. Further, burning is rapid in the relatively narrow clinkering zone, while the introduction of secondary air insures an equally rapid and intensive cooling of the clinker. The kiln is discharged by a mechanical grate, employing the air and dust-tight Andreas discharging lock. Figure 5 shows the burning platform of the shaft kiln plant.

The daily output per kiln is 140 tons of clinker of normal rotary kiln quality, with a fuel consumption of 16 to 17 per cent anthracite slack; i. e., about 205,000 B.t.u. per 100 lb. of clinker. The cement obtained from this shaft kiln clinker (having 10-12 per cent residue on the 180-sieve) was tested for compliance with the Swiss These values satisfy the extremely high requirements the clinker.

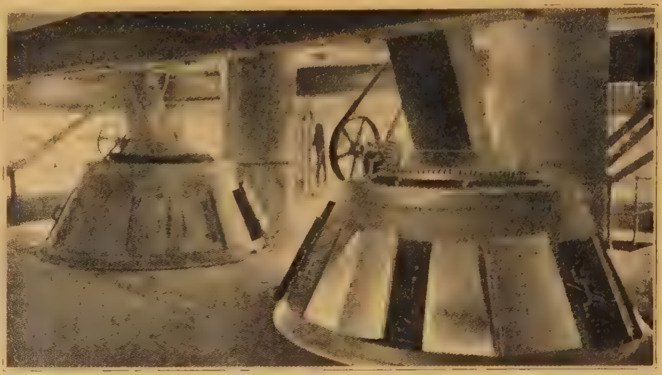


Figure 5. Burning platform of the shaft kiln plant

The cement mills are two three-compartment compound specification at the Zurich Federal Materials Testing Station, with the following results:

	Tensile strength, lb. per sq. in.	Crushing strength, lb. per sq. in.
3 days	340	5,000
7 days	455 to 500	6,400
28 days	640 to 710	9,250 to 10,650

of the Swiss specification.

Rotary Kiln Exit Gases Utilized

A portion of the blended raw meal is conveyed to the rotary kiln, which works the dry process. The kiln already installed is of 9.2 ft. diameter and 148 ft. long (Figure 6), driven by an electric motor.

The kiln is simple in design, consisting of a tube uniform in section throughout, i. e., without any enlargement. The kiln exit gases are used to preheat and calcine the raw materials so that the gases leave the kiln at a temperature of 160 to 170 deg. C. The Andreas rapid cooler is installed. This requires very little space, and recovers the heat of the clinker in the form of dust-free preheated air, which is fed to the kiln. The daily output of the kiln is 220 to 240 tons, with a fuel consumption of 16 to 17 per cent, equivalent to 191,000-199,000 B.t.u. per 100 lb. of clinker. Three large sheet-iron silos of more than 3,000 cu. yd. capacity are installed for storing mills of the same dimensions as the raw mill, each of which grinds 30 to 32 tons per hour, or about 88 lb. per (metric) horsepower hour. Each mill is provided with a special dust-extracting plant. The ground cement is stored in a 5-unit silo system of 3,250 cu. yd. capacity. These are emptied by means of the chain discharge. The packing plant consists of two valve-bag packing machines having four filling nozzles each and a total hourly output of 1,600 to 1,800 sacks. The daily output of the works can thus be comfortably handled in 8 hours.

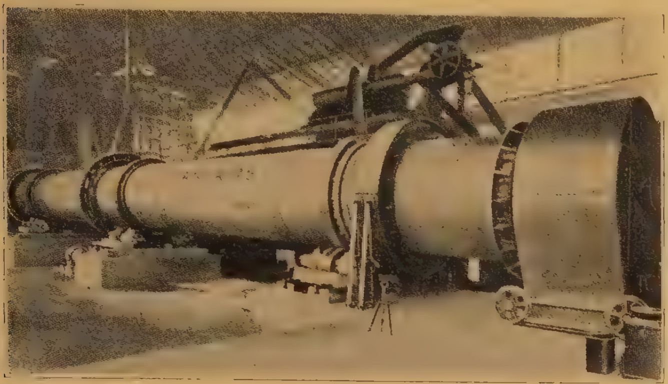


Figure 6. The rotary kiln is 9.2 ft. in diameter and 148 ft. long

The incoming coal and gypsum are emptied into bunkers situated between the sidings, and (after preliminary crushing of the gypsum) are conveyed to the four coal silos (about 2,000 cu. yd. capacity), or the gypsum silo (200 cu. yd. capacity), which are all fitted with the plate discharge. For the shaft kiln, the coal is used as delivered; for the rotary kiln it is dried in a rotary dryer and ground in a special compound mill for coal grinding.

With a view to ultimately doubling the output, the complete foundations for a second hammer-crusher, dryer, raw mill, two shaft kilns, one rotary kiln, and one cement mill were laid down as part of the initial scheme. The plant obtains alternating current at 20,000 volts from a cross-country supply, which is transformed down to 500 volts at the works. The plant can be operated with only 18 workmen per shift. The electrical equipment of the works was supplied by the Swiss firms Brown and Boveri, Baden, Orlikon, and the Brugg cable works.

Alpha Ironton Plant Resumes Operation for Indefinite Period

Operating at two-thirds of capacity, the Alpha Portland Cement Co. plant at Ironton, Ohio, went back to work on September 15, for an indefinite length of time.

Circulars on Cement Markets of the Western Hemisphere

Under the general heading of "Cement Markets of the Western Hemisphere," the U. S. Bureau of Foreign and Domestic Commerce is issuing a series of special circulars dealing with the markets for portland cement in the various Latin-American countries.

Separate circulars are issued on each country included in the survey. The information supplied includes, in general, the annual domestic production, annual imports from various countries, statements of the principal consuming agencies, prevailing prices, importing facilities, handling charges and freight rates, kinds and cost of containers, sales methods usually employed, probable future demands for cement, and other pertinent items of value to present and prospective exporters.

Among the countries already covered by these commerce reports are Mexico, Honduras, Guatemala, Venezuela and Ecuador.

The circulars are based on information supplied by consuls, commercial attachés and other contributors of data pertaining to foreign commerce.

Lehigh Earnings Equal $2.35 on Preferred Stock

The Lehigh Portland Cement Co., Allentown, Pa., for the 12 months ended September 30, reports a net profit of $482,352 after depreciation, federal taxes, and other charges, equal to $2.35 a share on the 204,969 shares of 7 per cent preferred stock.

In the previous year the company reported for the 12 months ended August 31, and showed net profit of $1,534,477, equal after preferred dividends paid to 16 cents a share on the 450,348 shares of common stock.

New Plant for Cement Industries, Ltd., at Asheham, England

A large new portland cement plant is to be built at Asheham, England, for Cement Industries, Ltd., by Edgar Allen & Co., Sheffield. The factory is designed for an ultimate production of 200,000 tons per annum, and will be made up of three units of 66,000 tons each, the first of which is now being installed.

The equipment of the first unit will include a rotary kiln of the recuperator type, Rexman balanced rod mills, and Fuller-Kinyon cement-conveying equipment.

Magnesium Content Determined in Less Than One Hour

The determination of magnesium is one of the most annoying time consumers in many cement plant laboratories. Not infrequently a shipment must be held for 24 hours or more while the cars are sampled and the samples tested for magnesium content.

The December issue of the *Cement Mill Edition* of CONCRETE will describe a new method of procedure developed by a cement plant chemist in the Lehigh Valley district, whereby an accurate volumetric determination of magnesium in portland cement may be completed in less than one hour.

The procedure will be given in detail and will doubtless be accorded general acceptance by industrial chemists.

Quarry Operations and Costs *at* Trinity Plant Near Dallas

Geology of Rock Formation—Physical and Chemical Characteristics of Stone—Methods of Prospecting, Exploration and Sampling—Drainage Difficulties Overcome

By J. WILLIAM GANSER[1]
Chief Chemist, Trinity Portland Cement Co., Dallas, Tex.

This article is one of a series being prepared by the U. S. Bureau of Mines describing mining and milling methods and costs at cement plant quarries throughout the United States. These papers are designed to disseminate technical information regarding the methods used. The cost tabulations represent local operating expenditures only and not total production costs. It is recognized that publication of total production costs might in many instances cause embarrassment to individual producers as well as to the industry as a whole. On the other hand, operating costs are essential to the technical discussion and study of the methods employed. The attention of the reader is specifically called to this differentiation in order that no misunderstanding of the scope of the cost tabulations shall ensue.

The author wishes to acknowledge the assistance of Fred Burkett, civil engineer, and F. O. Londrey, chief clerk, of the Trinity Portland Cement Co., for assistance in preparation of this paper. "The Geology of Dallas County, 1918," Bulletin 1818, Texas Geological Survey, Austin, Tex., by E. W. Shuler, was also freely consulted.—The Author.

IN 1908 the Southwestern Portland Cement Co. broke ground for its plant on a site 7 miles west of Dallas, on the western outcrop of the limestone belt. The mill was built by W. H. L. McCourtie and W. F. Cowham, and the first cement was manufactured during July, 1909. The plant was originally designed for an output of 1,500 barrels per day; but not many years passed before demand exceeded this capacity, and it was then increased to 3,500 barrels.

The company operated under the name of the Southwestern States Portland Cement Co. until 1914, when the name was changed to the Trinity Portland Cement Co.

The quarry, situated about a half mile east of the mill, at that time showed a limestone outcrop 20 to 25 ft. high, much of which was decomposed due to weathering; but the present quarry face is 35 to 40 ft. high. The shale necessary in the manufacture of cement is obtained directly under the lime rock.

Geology

The limestone which we quarry, commonly called "white rock," is an outstanding topographic feature of

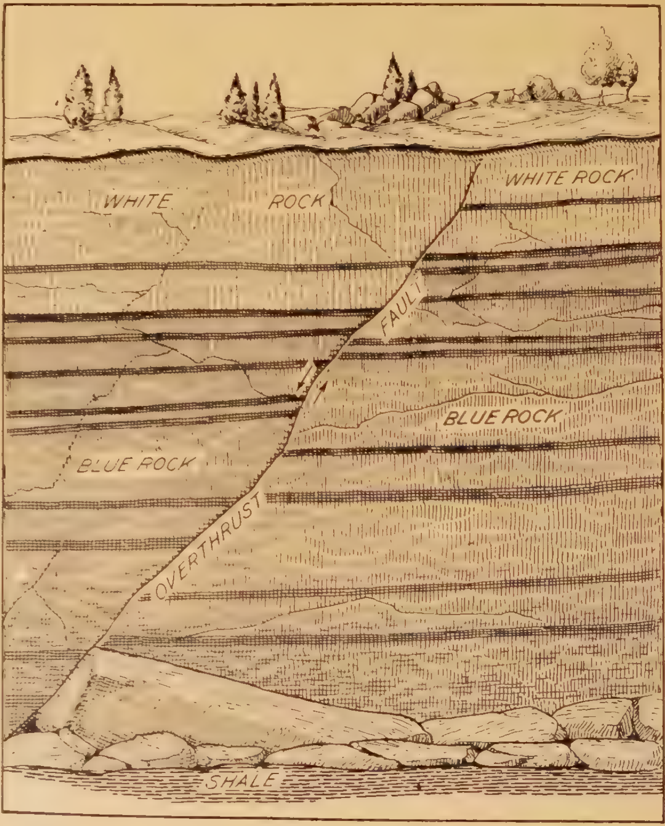


Figure 1. Cross-section of Austin chalk at the quarry of the Trinity Portland Cement Co.

Reprinted from U. S. Bureau of Mines Information Circular 6498.

[1] One of the consulting engineers, U. S. Bureau of Mines.

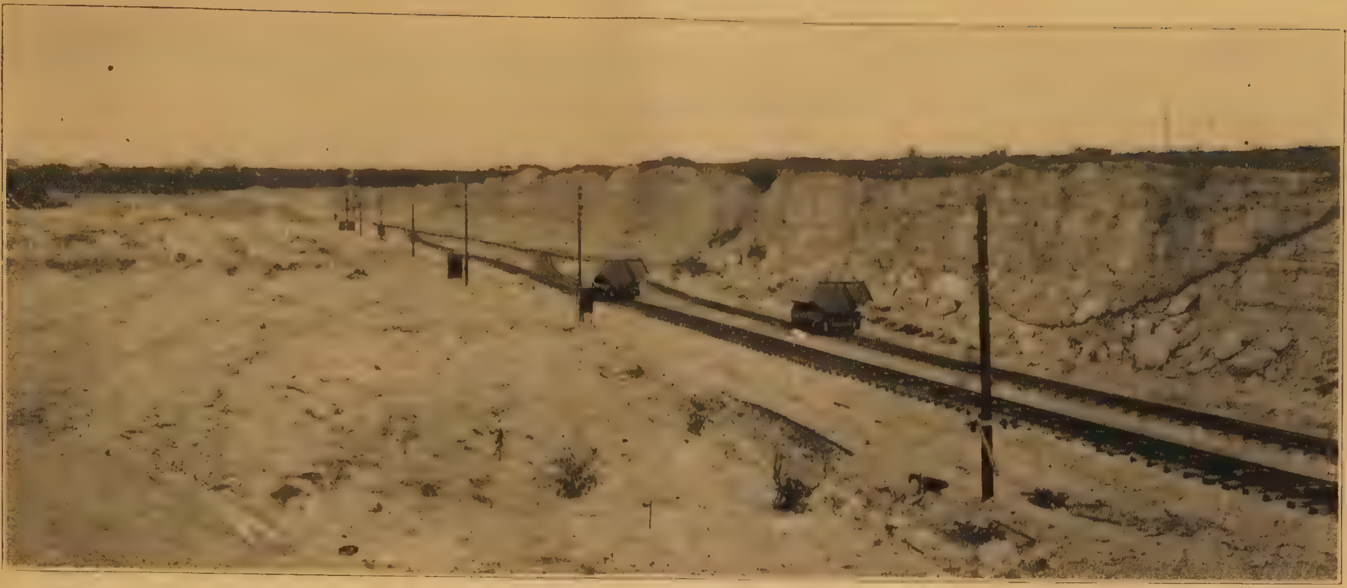


Figure 2. The quarry face as it appeared in October, 1930. Tracks and cars shown are part of remote-control installation

the country in that it is a well-defined formation developed in an indurated chalk and marl-limestone formation. This formation is about 10 miles wide, running east of north and south of west, and is known as the Austin chalk, which is of the upper cretaceous age. Although the formation is called Austin chalk, there are only a few layers properly termed "chalk." The white rock is much softer than the blue rock, which is also present in large quantity.

The Eagle Ford shales which lie beneath the Austin chalk have an average thickness of about 500 ft. They are generally soft, weather rapidly, and are predominantly blue or bluish-black. However, their upper layer is a 6-in. seam of exceedingly hard conglomerate made up of shells and sand. Below this seam there are many blue lime concretions of various sizes which obtain their color from carbonaceous material.

The overburden, a dark brown soil becoming very waxy when wet, is not stripped. It varies in thickness from a thin layer to 8 or 10 in. except for occasional pockets sometimes 2 ft. in depth.

Physical Characteristics of Stone

The Austin chalk disintegrates quite rapidly when exposed to the weather, and the organic matter in it is leached and carried away. As a result the first 100 to 150 ft. of the outcropping limestone is cream-colored. This stone is easily broken with explosives and crushed with little difficulty. However, the quarry as it is today consists mostly of a bluish gray stone from which the organic matter has not been leached. The top 6 or 8 ft. of the quarry face is creamy white, and wherever there is a fissure the creamy-white rock is from 4 to 12 in. wide along it.

Characteristic of the Austin chalk are the large number of fault planes. The dip of these fault planes is generally about 45 deg., and the strike is northeast and southwest. We had an excellent opportunity to determine these dips accurately because of the smooth quarry face left by an Adel excavator which was at one time used to get out the rock. This excavator was an electrically operated machine with a bucket elevator, containing tool-steel cutters between every second bucket, the cutters being forced against the face of the rock and shaving off the limestone, which was picked up by the buckets and elevated to a bin and from there loaded into cars. The cuttings of this machine ranged from fine powder to pieces 2 or 3 in. long and about 1 in. in diameter. Had the excavator worked satisfactorily it would have been unnecessary to operate a preliminary crusher; but unfortunately the rock was too hard and the cost of repairing the machine became prohibitive, so its use was discontinued.

Figure 1 shows a cross-section of the Austin chalk, the beds of which have a general dip varying from 40 to 100 ft. per mile, and an average dip of 50 to 60 ft. The chalky layers are separated by thin layers of hard, marly rock, which on exposure to the weather disintegrate and are etched back more rapidly than the massive chalks, giving the quarry face a rippled or ledgy appearance. The chemical composition of the various deposits may be seen in Table 1. The surface rock weathers into a productive, brownish-black soil.

TABLE 1

Chemical Composition of Rock and Shale, Per Cent

	SiO_2	Fe_2O_3	Al_2O_3	$CaCO_3$	$MgCO_3$
Blue chalk	6.60	1.57	3.13	85.11	1.05
White rock	3.20	1.27	1.61	92.49	.95
Hard marly rock, easily disintegrated	16.82	2.82	10.60	65.20	3.74
Eagle Ford shale	51.90	4.86	19.04	10.17	2.15

Method of Prospecting and Exploration

The quarry was first opened on a face about 20 ft. high. The rock was drilled with hand augers and the drillings were sampled for chemical analysis. Carpenters' nut augers which were used for boring the rock were 2 in. in diameter, 19 in. long and had the ½-in. threaded point removed. The augers were tempered and then sharpened with a file whenever the operator thought they needed it. About 400 to 500 ft. of rock was bored before the auger was retempered, and about 5,000 to 6,000 ft. were bored before the auger was worn sufficiently to be discarded.

One man operated each auger and was able by attaching 4-ft. joints of ¾-in. pipe to drill about 75 ft. a day and to put down holes 30 ft. deep. This was quite a difficult task as it was necessary to pull the auger many times in order to remove the cuttings. After using this laborious method for several years a homemade, gasoline-driven churn drill was put into operation, but was later replaced by an electrically driven cyclone drill.

Sampling and Estimation of Tonnages and Values

None of the rock is sampled at the quarry, as it would be impossible to get a representative sample, but a continuous sample is taken after the lime rock containing some shale has been pulverized by the Krupp ball mills. The ground material is conveyed to one of four steel bins each having a capacity of 84 tons. When one of these bins is full the sample is collected for a quick lime determination in order to ascertain the percentage of shale necessary to be added to make a proper raw mixture. A composite sample of all of these bin samples is completely analyzed each month. The shale is analyzed only occasionally, as there is practically no variation in it.

Choice of Method

As already stated, the overburden is not removed, but mixes with the rock and is loaded with it into cars for the crusher.

Open quarrying is the only feasible and the most economical method of obtaining the rock. In opening the quarry the operation was simple, as the outcrop formed a bluff. After shooting the face it was only necessary to head into the rock with a steam shovel, with the quarry tracks laid on the Eagle Ford shale along the face. The quarry face is now 30 to 40 ft. high, but it will eventually be 50 to 55 ft. high as the surface rises and the base dips away from the face.

The quarry face is now being operated in a fairly straight line, although when the quarry was first opened, and for many years after, it was worked with a circular face.

Drainage Difficulties

Drainage has always been a problem. Because of the dip of the quarry floor each cut made by the shovel is lower than the preceding one, and often after a rain the shovel stood in water. This water was either pumped out by a motor-driven centrifugal pump with a capacity of 300 gallons per minute or was syphoned by means of steam from the shovel.

Drainage for the present has been provided by ditches dug with an electric shovel. These ditches are much lower than the quarry floor will be for several years.

(The next installment of this article will tell of the methods employed in drilling and blasting, and in loading and transportation, and the crushing plant will be described.)

Plant Organization Wins the Trophy

Getting Responses From Men—Disciplinary Measures in a Few Cases—Details of 1930 Campaign—Record of 589 Days Without Lost-Time Accident

By J. W. TEMM
Chief Electrician, Alpha Portland Cement Co., La Salle, Illinois

IN 1923 we had 43 lost time accidents, 33 first aid cases and 89 medical cases at the La Salle plant of the Alpha Portland Cement Company. In 1924 we had 46 lost time accidents, 433 first aid and 57 medical cases. We had a gain of 400 first aid cases over 1923, which means that our first year of safety effort was beginning to get results. There is no doubt that we should have had more first aid cases in 1923; but the men were not then interested in safety work. In 1924 they were beginning to see the advantage of first aid to prevent lost time accidents.

Making Rapid Progress in Accident Prevention

The following figures show the gradual decrease in lost time since the start of our safety work. In 1925 we had 17 lost time accidents, 277 first aid and 31 medical cases: in 1926 we had 17 lost time accidents, 351 first aid and 32 medical cases; in 1927 we had 6 lost time accidents, 364 first aid and 28 medical cases; in 1928 we had 10 lost time accidents, 409 first aid and 26 medical cases; in 1929 we had two lost time accidents, 284 first aid and 14 medical cases; and in 1930 we had no lost time accidents, 178 first aid and 15 medical cases.

Getting Organized

In 1922 we organized our first safety committee and started our first safety work; this committee consisted of the superintendent, foreman, workmen, chairman and secretary and we only held one meeting a month.

We started off with the main object of getting home to the men the proper safety thought by asking for suggestions for safeguards, improvements in practices, and any other suggestions pertaining to safety, and then carrying them out to the limit if physically and financially possible. This was one way of getting the employees to see that the management was behind this movement.

Condensed from paper presented at Regional Safety Conference, Davenport, Iowa, April 2, 1931.

After trying this we learned that the safety education of the individual was absolutely necessary if we were to get any place.

Driving the Safety Idea Home

We thereafter started campaigns with posters; increased the number of meetings during the month; had speakers; held individual interviews; and, in fact, did everything we thought of in order to get the men to realize just what safety meant to them; but we were still far from a trophy.

The next thing we tried was to hold separate meetings of the men with no foreman or any one in charge of men present. Our reason for doing this was to stop ridicule, prejudice, shyness, contradictions and so forth. This we found was a very good thing to do, as we had immediate response from the men in the way they talked at meetings.

Getting the Men to Talk

These meetings were always followed by a meeting of the foremen to discuss the minutes of the men's meeting, but no names were ever mentioned in connection with what occurred at the meeting of the men.

After instituting the above plan we found that there was still something lacking, for we were not getting complete results.

It seemed that no matter what we tried, there were some men who would not accept the safety work, so we finally decided to adopt disciplinary methods with those few; and the effect was surprisingly good. It did not require very much of this. We had to discharge one man, and two others drew short layoffs. Then we began to get results.

This brings us down to 1930, with our last lost-time accident on August 19, 1929. At the last regular committee meeting in 1929, it was decided that we should intensify all our previous efforts and methods and to start a few new ones.

We then put it directly up to the foremen by making them responsible for all safety conditions and acts in and of their respective departments, under the general supervision of the regular safety committee, which consists of the superintendent, all foremen, a chairman and secretary. It was decided to bring all safety offenders before this body, investigate all first aid, medical cases, and accidents of any type pertaining to safety, and then follow them up very closely; this last I believe had considerable bearing on our winning the trophy.

Following Up a Typical Case

For an illustration I will cite one follow-up case which, if it had not been traced, would have cost us our trophy.

A man working in the quarry complained of wrenching or spraining his back. He received first aid but did not report for work the next day. This was immediately followed up by the men appointed to do this.

They went to his home and after a delay of about five minutes got in to see him. He was in bed with all of his clothes on and was sweating like a trooper. His house was in the process of a general cleaning and papering, and it was assumed that he was doing most of the papering, which afterwards proved correct by his own admission.

This man was brought back to work, put on his old job and never complained. He was afterwards disciplined and made to see his mistake, and we have a better safety worker now.

I do not wish any one to think that cases of this kind are brought back to the plant and a job created for them. We do not bring a man back unless he can fill his old job.

The Stimulating Value of Contests

We instituted a number of contests such as ideas for posters, slogans, and so forth. We inaugurated individual inspections by men from different departments to other departments; directed the foreman always to give safety orders with each job order, no matter how small the job; had safety reminder cards printed and given out every day to each man for him to sign and return to his foreman, while the foreman returned the cards to the safety committee.

We also gave a number of prizes each month, had department competitions, safety talks throughout the mill, and were finally able, on the 31st of December, 1930, to to go over the top for our trophy. We now have, to date, 868 days for our quarry and 589 days for the complete plant, and hope to continue ad infinitum.

Universal Atlas Plants Have Perfect Safety Records for First Nine Months of 1931

Plants of the Universal Atlas Cement Company at Northampton, Pa.; Leeds, Ala., and Independence, Kan., have gone through the first nine months of 1931 without a lost-time accident, Gordon C. Huth, safety director of the company, announced October 1.

Especially gratifying, according to Mr. Huth, is the record of the Northampton plant. This is one of the company's largest mills and also one of the largest mills in the entire country. In addition, the Hannibal Connecting Railroad which also is a Universal Atlas property has gone without an accident since July, 1929.

Safety work at Northampton is in charge of M. W. Winsch, general superintendent, W. E. Gehres, safety supervisor, and the plant's safety committees. At the Leeds plant the safety work is in charge of B. E. Merrell, superintendent, D. M. Goss, safety supervisor, and the plant committees. At Independence, C. M. Carman, superintendent; Fred J. Davis, safety supervisor, and the safety committees handle the safety campaign.

In speaking of the record, Mr. Huth said, "The gratifying records achieved by these three plants may be traced to a complete assumption of responsibility by operating officials and supervisory forces as well as personal responsibility on the part of every worker."

Another One?

Mineral Point, Wis.—Several Mineral Point residents are considering the possibility of establishing a cement factory here to utilize the limestone around here and which is claimed to be excellent material for cement. A cement making expert is here to look the field over and analyze the limestone.

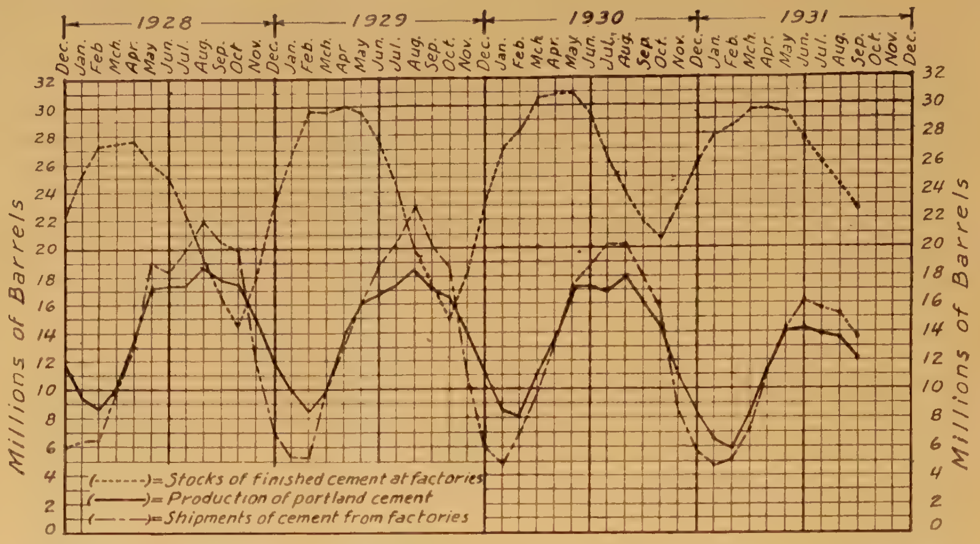
Cement Statistics for September

Average Plant Production During Month Is 50 Per Cent of Capacity

Relation of Production to Capacity

(Figures represent per cent)

	The Month	The Twelve Months
September, 1931	**55.3**	50.2
September, 1930	**75.7**	65.2
August, 1931	**60.2**	52.0
July, 1931	**62.0**	53.8
June, 1931	**65.4**	55.2



	1930	1931	Increase or Decrease, %
Production, September	**16,124,000**	12,092,000	—25.0
Shipments, August	**18,083,000**	13,671,000	—24.4
Stocks at end of month	**21,889,000**	22,734,000	3.9

	1930	1931	Increase or Decrease, %
Total production for yr.	**126,917,000**	99,673,000	—21.4
Total shipments for yr.	**128,673,000**	102,807,000	—23.4
No. of plants reporting	**166**	165	—6

Production, Shipments, and Stocks of Finished Portland Cements, by Districts, in September, 1930 and 1931, and Stocks in August, 1931

District	Production—September		Shipments—September		Stocks at end of month		Stocks at end of August, 1931*
	1930	1931	1930	1931	1930	1931	
Eastern Pa., N. J. and Md.	**3,273,000**	2,761,000	**3,813,000**	3,108,000	4,966,000	**5,422,000**	5,769,000
New York and Maine	1,238,000	**1,292,000**	1,467,000	**1,500,000**	1,069,000	**1,280,000**	1,489,000
Ohio, Western Pa. and W. Va.	**1,873,000**	1,063,000	**1,984,000**	1,224,000	3,079,000	**3,344,000**	3,505,000
Michigan	**1,242,000**	743,000	**1,381,000**	807,000	**2,279,000**	1,912,000	1,975,000
Wis., Ill., Ind. and Ky.	**2,171,000**	1,623,000	**2,716,000**	1,995,000	**2,751,000**	2,648,000	3,020,000
Va., Tenn., Ala., Ga., Fla. and La.	**1,198,000**	1,069,000	**1,178,000**	1,032,000	**1,814,000**	1,725,000	1,687,000
Eastern Mo., Ia., Minn. and S. Dak.	**1,748,000**	1,228,000	**2,116,000**	1,341,000	1,569,000	**2,361,000**	2,474,000
W. Mo., Nebr., Kans., Okla. and Ark.	**1,233,000**	701,000	**1,227,000**	886,000	**1,643,000**	1,305,000	1,490,000
Texas	**679,000**	625,000	599,000	**688,000**	**707,000**	539,000	603,000
Colo., Mont., Utah, Wyo. and Idaho	**260,000**	171,000	**258,000**	224,000	508,000	**532,000**	585,000
California	**806,000**	529,000	**905,000**	593,000	1,020,000	**1,050,000**	1,114,000
Oregon and Washington	**403,000**	287,000	**439,000**	273,000	484,000	**616,000**	602,000
	16,124,000	12,092,000	**18,083,000**	13,671,000	21,889,000	**22,734,000**	24,313,000

Production, Shipments, and Stocks of Finished Portland Cement, by Months, in 1930 and 1931

Month	—Production—		—Shipments—		Stocks at end of month	
	1930	1931	1930	1931	1930	1931
January	**8,498,000**	6,595,000	**4,955,000**	4,692,000	27,081,000	**27,759,000**
February	**8,162,000**	5,920,000	**7,012,000**	5,074,000	28,249,000	**28,612,000**
March	**11,225,000**	8,245,000	**8,826,000**	7,192,000	**30,648,000**	29,676,000
April	**13,521,000**	11,245,000	**13,340,000**	11,184,000	**30,867,000**	29,715,000
May	**17,249,000**	14,010,000	**17,224,000**	14,200,000	**30,891,000**	29,554,000
June	**17,239,000**	14,118,000	**18,781,000**	16,077,000	**29,364,000**	27,602,000
July	**17,078,000**	13,899,000	**20,153,000**	15,545,000	**26,289,000**	25,934,000
August	**17,821,000**	13,549,000	**20,299,000**	15,172,000	23,824,000	***24,313,000**
September	**16,124,000**	12,092,000	**18,083,000**	13,671,000	21,889,000	**22,734,000**
October	14,410,000	....	15,599,000	....	20,697,000	....
November	11,098,000	....	8,784,000	....	23,056,000	....
December	8,480,000	....	5,688,000	....	25,838,000	....
	160,905,000	....	158,744,000	....	....	....

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*Revised.

Blacker type indicates larger of two figures.

MEN and MILLS

NOTES FROM ✦ THE FIELD ✦

Chapin A. Day of Utah-Idaho Dies in 77th Year

Chapin A. Day, well-known intramontane cement manufacturer and founder of the Utah-Idaho Cement Company, formerly the Ogden Portland Cement Co., died in the Dee Memorial Hospital at Ogden, Utah, on October 15, following an operation on the previous day. Mr. Day, who was in his seventy-seventh year, had been unwell for about a month.

Mr. Day first became acquainted with the cement industry in 1874 when he entered the service of the Natural Cement Co. of Utica, Ill. He was born in Blue Island, Cook County, Ill., and was graduated from the Marseilles high school. After being in the cement industry a short time, he entered the service of a bank at Utica where he spent two years, later becoming a commission man in Chicago.

The thirty-five years following were spent with the Field-Leiter Co., afterwards Marshall Field and Co., where he rose to the position of secretary-treasurer. He retired from this capacity in 1911 and settled in Ogden. He could not persuade himself to remain idle, however, and for the past 20 years Mr. Day had devoted his energies to his cement business with such success that it became widely known in the mountain territory.

Mr. Day was the father-in-law of Ralph E. Bristol, manager of the Utah-Idaho Cement Co., who with a widow and a number of children, survive him. He was prominently identified with many Ogden clubs and organizations and was one of her most respected citizens.

Poston, Wellston Vice-President, Passes Away

E. M. Poston, 69, vice-president and director of the Wellston Iron Furnace Company, died at his home in Columbus, Ohio, October 9. Death followed a week's illness with diabetes. Mr. Poston was active in the operations of the company and prominent in business affairs.

The cement plant of the Wellston company is located at Superior, Ohio.

Boeye, North American Official, Passes Away

F. A. Boeye, vice-president and general sales manager of the North American Cement Corp., Albany, N. Y., died on October 3 at his home in New York at the age of 47.

Mr. Boeye made his headquarters in New York City.

Wayne Wallace Wins Association Golf Tournament

With a gross score of 144 for 27 holes, Wayne W. Wallace, of the Chicago district office of the Portland Cement Association, finished as the dark horse to win the sixth annual fall golf tournament of the association, at St. Andrews Golf Club.

Andy A. Anderson, of the highways bureau, won the association cup for low net score, and L. P. Corcoran, of the Chicago district office, carried off the putting prize with the low score of 51 putts for 27 holes.

Smoker and Get-Together Mark Manitowoc Safety Record

A two-year perfect safety record, with no lost-time accident, was commemorated by the Manitowoc Portland Cement Company at Manitowoc, Wis., on the evening of October 2 when employes were entertained at an informal smoker and get-together.

The plant has been in continuous operation on a 7-day basis with each day consisting of 24 working hours.

Safety work at the plant has been one of the objectives successfully conducted through the active co-operation of the employes with the management. Those who may appear to be careless and likely to break the long-established record are tried before a court of their fellow employes.

Briant Appointed in Charge of Mellon Institute Research

Raymond C. Briant has been appointed to take charge of research work contemplated under the fellowship recently established at the Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh, Pa., by the Green Bag Portland Cement Co. Mr. Briant has been engaged in cement research at the U. S. Bureau of Standards, Washington, D. C.

Daughter of Vice-President Ignites New Glens Falls Kiln

Miss Jane K. Bayle, daughter of George F. Bayle, Jr., vice-president and sales manager of the Glens Falls Portland Cement Co., Glens Falls, N. Y., on September 26, "flashed the light" on the new plant kiln.

In igniting the new 382-ft. kiln, illustrated in another news item in this issue, Miss Bayle followed the tradition at the plant that each new kiln be lighted by a woman member of the family.

Mill Equipment

Plunger Type Weatherproof Limit Switch May Be Foot Operated

A new plunger type, snap action, weatherproof limit switch, bearing the type designation CR-9441-LS443D and designed for general industrial applications has been announced by the General Electric Company. The switch is particularly adapted for foot operation and may be mounted in any position.

The switch has six separate electrical circuits, three normally open and three normally closed. Each contact arm in the switch may be removed by taking out a screw for easy access to the terminal studs for connecting the control lines.

The switch has a positive snap action, in either direction, and is operated by a cam and ball mechanism. The plunger is fitted with two main springs. The returning spring resets the switch in normal position when pressure is removed from the plunger while the overtravel spring compensates for any overtravel in excess of the half inch required to operate the switch.

As pressure is applied to the plunger, the return spring compresses from a pressure of 26 pounds at 1⅞ inches in length to 45 pounds at 1⅜ inches in length where the switch snaps over. When pressure is removed from the spring plunger, this increased energy in the return spring snaps the switch mechanism back to normal position.

The normal pressure of the overtravel

spring is 50 pounds at 1⅞ inches in length. Consequently, this section will act as a solid member during the normal operation. However, in case the adjustment of the switch is not accurate, any overtravel up to one-half inch will be taken up by the overtravel spring. A round head set screw and lock nut is supplied as part of the overtravel member for adjusting the switch when installing it.

The switch is said to be of rugged construction and is particularly adapted for rough-duty installations. The enclosing case is of weatherproof cast iron construction. An opening in the side of the case permits the connection of a one-inch conduit. All bearings are made of oil-less bearing material and consequently no lubrication is needed after installation, it is stated.

Slurry Pump Is New Amsco Unit; Bearing Construction Feature

As a unit especially adapted for handling wet, abrasive materials, the Amsco Type C centrifugal pump is recommended for the pumping of slurry by the American Manganese Steel Co., Chicago Heights, Ill.

The pump or water end is somewhat similar to the design previously employed in the lighter types of Amsco units, the greatest change being in the development of the Type C bearing. The main bearing of the unit is especially long, it is stated, in proportion to the shaft diameter. The accommodation for taking up the thrust of axial loads is incorporated with the main bearing. The latter constitutes what is known as a slippage seal adjustment, to enable the shaft and the impeller to be moved horizontally within the casing. The purpose of the adjustment is to provide means for keeping the impeller as close as possible to the entrance side of the pump to maintain the highest possible hydraulic efficiency and permit a minimum of wear.

Another of the features of the main bearing construction is its adaptability for use either with a ring oiling type bearing or with anti-friction bearings, either ball or roll type, without imposing the necessity for radical bearing changes.

The main base, pedestals, etc., are all provided with heavy metal sections and with cross ribs to maintain rigidity. It is practically impossible to pull this pump out of alignment, even when the pump is set on an uneven foundation and with the bolts heavily drawn down, according to the manufacturer.

Allen-Bradley Adds New Motor Control Stations to Line

Four-button and 5-button stations have been added to its line of Bulletin 800 push-button control stations by the Allen-Bradley Co., Milwaukee, Wis.

The Type N-1060 series of 4-button stations have three running buttons, giving three motor speeds, and one "stop" button. These buttons may be designated First — Second — Third — Stop, Slow — Medium — High — Stop, Fast — Slow — Start — Stop, Start — Slow — Fast — Stop, 600 — 1200 — 1800 — Stop, or any other figures showing the three motor speeds. The stations are said to be used extensively with automatic switches for 3-speed motors of the multispeed squirrel-cage type.

The addition of a 2-way lever switch to the stations mentioned converts them into the Type N-1090 series of 4-button stations. The two lever positions may read Off-On, Inch-Run, or Safe-Run.

The 5-button stations, known as the Type N-1080 series, are for use with 4-speed multi-speed motors, giving four running speeds and "stop." These are available in several designations, including 1st-2nd-3rd-4th-Stop, and different motor speeds.

About the Manufacturers of Equipment

Industrial Literature

Elevating, Conveying Catalog

A complete catalog on standard and special elevating and conveying machinery has recently been published by the *Fairfield Engineering Company*, Marion, Ohio, specialists in the design and construction of this type of equipment for practically every purpose. Its hundred pages contain information needed by buyers of elevating and conveying machinery, for the purpose of aiding them in suitable selection for their particular needs.

A few of the subjects covered are the Selection of a Belt Conveyor; Storage Silo Systems; Installation of Bucket Elevators; V Bucket Conveyors; Flight Conveyors; Apron Conveyors; Package Conveyors; Spiral Conveyors; Skip Hoist Installation; the use of Coal Handling Equipment as well as other subjects. It is profusely illustrated with actual installations that might apply to numerous prospective installations. A copy of this catalog will be sent to anyone interested in this type of equipment.

New Heavy Duty Motors

A 4-page leaflet describing a new mill motor has recently been announced by the *Westinghouse Electric and Manufacturing Company*. This new motor embodies the latest recommendations of the Association of Iron and Steel Electrical Engineers, it is stated.

The application of the motor includes heavy duty operations such as cranes, hoists, shovels, coal bridges, mine hoists, turn tables, transfer tables, conveyors, etc.

Copies of this leaflet 20525 may be obtained from the nearest district office or direct from the advertising department, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania.

Curtis High Alumina Brick

A brochure on Curtis high alumina brick for use in lining rotary kilns has been issued by *Algernon Lewin Curtis*, of Chatteris, England. The brick are manufactured in France, at the source of the raw materials.

They are said to average 60 per cent alumina and to have a high refractory value.

Story of Fahralloy

The interesting story of *Fahralloy* and its applications is told in a 6-page folder distributed by the *American Manganese Steel Co.*, Chicago Heights, Ill.

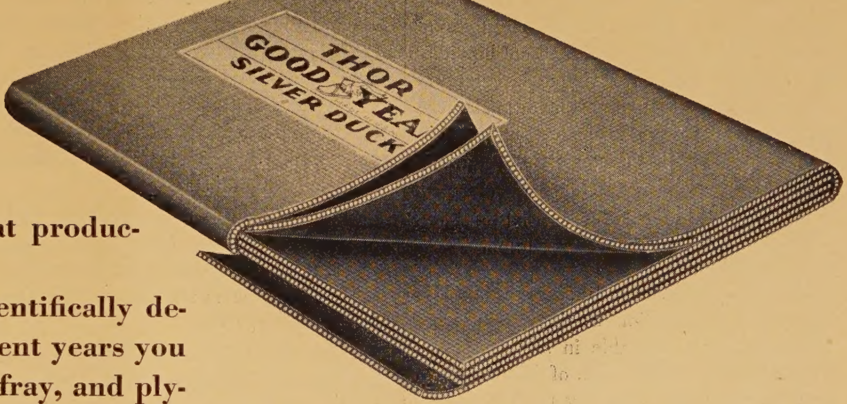
Each of the twelve different analyses is defined as to constituents and use.

Fahralloy is being used in the cement industry, it is stated, for kiln feed pipes, burner tips, pyrometer protector tubes, chains for hot clinker drags, liner plates for pressure coolers, liners and lifters for rotary clinker coolers, retainer rings for discharge end of kilns, and dampers.

Return Bend Economizer

Return Bend Economizers is the subject of a new bulletin issued by *The Babcock & Wilcox Company*, New York City.

WHEN YOU BUY THIS EDGE-PROTECTED BELT YOU'RE SAVING LOSS FROM SLIP AND FRAY



ONE way to beat production costs is better belting.

With the new belting scientifically developed by Goodyear in recent years you can save those costs of slip, fray, and ply-separation which mount up cruelly fast.

The new Goodyear THOR Belt, seamless*, for instance, is completely covered by a heavy fabric envelope which is *part of the ply structure of the belt.*

This ingenious construction means protection from two of the toughest enemies which attack belting on heavy drives—edge-fray and seam failure.

Because there is no central seam in the envelope of the Goodyear THOR Belt there is no place in the center of the belt to open up under flexing strains.

Because the edges are covered by the envelope, fray may not creep in from the sides to cause ply-separation and other structural weaknesses.

You can save money on all your machinery with this new design Goodyear Belting. The G. T. M.—Goodyear Technical Man—expertly specifies it to each of your drives. Just write to Goodyear, Akron, Ohio, or Los Angeles, California, and ask him to call.

** Goodyear THOR Belting, seamless, is made in widths up to and including 16"—THOR quality of special construction is available for larger sizes*

THE GREATEST NAME IN RUBBER

GOODYEAR

TRANSMISSION BELTING

This publication describes a forged steel return bend type economizer in which all the latest features of design have been incorporated and which, the company states, provides a high rate of heat transfer with a remarkable freedom from expansion strains.

All the details of the economizer, such as the return bends, headers, tubes, casing, etc., are fully described and illustrated by photographs and drawings.

Typical installation views and setting plans are shown, demonstrating the adaptability of the economizer to various types of boilers.

The booklet is attractively printed, bound and illustrated in colors.

Copies of this publication may be had by addressing the Babcock & Wilcox Company, 85 Liberty Street, New York, N. Y.

C-E Multiple Circulation Boiler

Combustion Engineering Corporation, New York City, has just issued a pamphlet describing the *C-E* multiple circulation boiler. This boiler is designed to provide the positive and unrestricted circulation which is so important in modern boiler practice with its high steam pressures, high temperatures and high rates of evaporation, it is stated.

The C-E multiple circulation boiler is a departure from the conventional design of bent tube boilers in two essentials—tube arrangement and steam liberation, according to the Combustion Engineering Corp.

This boiler is available in sizes ranging from 2,000 to 26,000 sq. ft. of heating surface. It is adaptable to any type of firing and may be set double.

The pamphlet contains tables of specifications covering the four types in which this boiler is manufactured.

Explosives History

The *"History of the Explosives Industry in America"* is on exhibition in the Du Pont exhibit on the boardwalk at Atlantic City, the *E. I. du Pont de Nemours Co., Inc.*, announces. This book puts the explosives industry in review for nearly a century and a half and traces explosives back to their beginnings centuries ago. A feature of the "History" is the biographical sketches of the pioneers in explosives making and the "captains" of a "key" industry. The 1,152 pages are illustrated with more than 500 illustrations, a number of which are of historical value. It is from the Columbia University Press, New York, and was written by Arthur Pine Van Gelder and Hugo Schlatter, two well-known explosives chemists.

Rubber Items

Such rubber products as belting, hose, mats and switchboard matting are included in the new and revised mechanical catalog issued by the *Diamond Rubber Company, Inc.*, Akron, Ohio.

Short-Center Drives

VIM Short-Center Drives is the name of a new 148-page belt treatise compiled by the engineering research staff of *E. F. Houghton & Company*, Philadelphia, Pa. It is said to be an entirely new treatment of efficient short center drives.

The book contains charts, tables, and engineering data on 5,000 standard Vim efficiency drives ranging from 5 to 100 h.p. It is built entirely around Vim special mineral tanned leather belting.

G-E Leaflets

Loose leaflets published recently by the *General Electric Company*, Schenectady, N. Y., are those on explosion-proof, totally enclosed, fan-cooled, single-phase motors, Type SCR, low-speed, synchronous motors; Types TS and QS, mechanical-drive turbines; Type D-58, non-condensing, and CR2931 float switches.

Speed Reducer Catalog

Catalog No. 53 published by the *Palmer-Bee Company*, Detroit, Mich., is devoted to its high efficiency speed reducers. Series of each type are covered comprehensively.

FIELD ACTIVITIES

Westinghouse Reorganizes Sales Department

To serve effectively the electrical requirements of all industries the industrial sales department of the Westinghouse Electric and Manufacturing Company has been reorganized under the direction of O. F. Stroman, industrial sales manager. The reorganized department is composed of units grouped according to the main classifications of industry.

Two assistant sales managers and 14 divisional managers have been appointed and the new organization also provides for the grouping of specialized engineers with every sales division.

Bernard Lester and C. B. Stainback have been appointed assistant sales managers. Mr. Lester, long an active participant in the application of electricity to industry, will have general charge of directing from headquarters the development of business with industrial users of electrical equipment. Mr. Stainback will have charge of apparatus applying to these industrial groupings.

Under Mr. Lester there has been created five industry divisional classifications. G. D. Bowne is manager of the general mill electrification division.

Nine divisions have been created under Mr. Stainback's supervision. They are headed by J. R. Olnhausen, manager, medium A. C. motor section; R. M. Davis, manager, medium D. C. motor section; R. O. Watson, manager, large motor section; D. H. Byerly, manager, small motor section; W. W. Reddie, manager, welding section; T. C. Kelley, manager, industrial heating apparatus; W. G. Balph, manager, safety switch section; W. H. McGillivray, manager, control section; and F. W. Horst, manager, cost section.

Amsco Moves; New Salesman

The Chicago office of the *American Manganese Steel Company* has been moved from 333 North Michigan Avenue to 332 South Michigan Avenue. There the firm is located with its parent company, the American Brake Shoe and Foundry Co.

E. R. Dougherty has joined the Amsco sales organization, and will work with *E. F. Mitchell*, district manager, in the engineering and sale of Fahralloy castings in Chicago and the surrounding territory.

Mr. Dougherty has had a substantial experience in this work, and is familiar with problems of the application of castings for high-temperature and corrosion services, and their solution.

Moore Co. Joins Link-Belt

The merger of the *George W. Moore Company*, of Chicago, with *H. W. Caldwell & Son Company*, a subsidiary of Link-Belt Company, is announced by Alfred Kauffmann, president, Link-Belt Company. The combined units are to be known as the Caldwell-Moore Division, Link-Belt Company.

Max H. Hurd, formerly president of the George W. Moore Company, becomes a vice-president of Link-Belt Company, in charge of the Caldwell-Moore operations.

Thus the facilities of two well-known manufacturers of similar lines of conveying equipment are consolidated in the interest of better service to the jobber and consumer, and Link-Belt Company acquires an entirely new line of manufacture, Salem elevator buckets, an important specialty of the Moore Company, according to an announcement.

Mr. Kauffmann states: "There will be no modification of the policies of the two companies, and no change in the diversity and character of products. It is the intention that customers shall freely avail themselves of the facilities of both companies at any time. The Moore line enjoys a high reputation. It is well made, it fits into the Link-Belt line of products without apology, and we are glad to welcome it into the Link-Belt family."